User's manual

LittleFoot Elegance Photo V6.xx

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1 Introduction

1.1 Preface

The Little Foot Elegance Photo project has been published as a do it yourself project under http://elegance.photo.rajiva.de . The used technology is described over there and declared state of the art.

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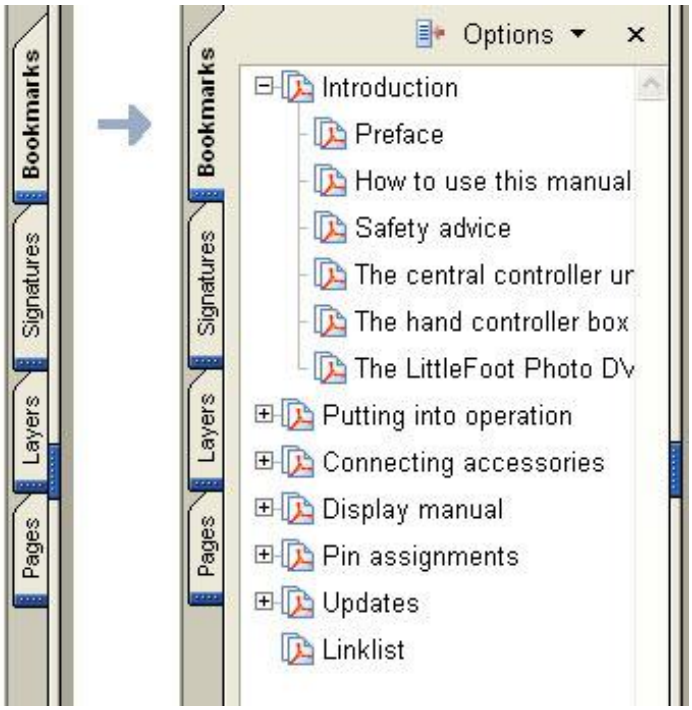
Copy and use is at one's own risk. We don't take any responsibility for any eventual harm caused by constructions based on the published blueprints and cards or the use of the associated software.

1.2 How to use this manual

Many users are afraid to read manuals especialy if they are as big as this one. To facilitate the navigfation in the manual you can just click on every point in the table of contents below or open the PDF table on the left hand side.



To prevent damage of the controller or the mounting it is very important that some settings must be made before the first use.

So here are the chapters that you really should read:

> Safety advice: general advice how to use the controller safely
> To enter into the display menu: as the controller is mainly configured an operated via display it is important to know how you can enter into the display menu.
> Setting of the motor current and the mount's parameters: it is important to set the current to the needed value. Otherwise the motors might be overloaded. You also must calibrate the controller for the mount. These settings are done in menu 3 of the display.

This advice should be sufficient for a first use. Anyway I recommend to go through the manual step by step. Only this will help you to understand all functions.

1.3 Safety advice

To make the LittleFoot Elegance Photo work safely you have to respect the following advice concerning safety.

The controller needs a DC voltage of min 12 V to 30 V max. As source you can either use a storage battery or a AC-DC converter that gives a controlled direct current voltage. Please use no other voltage, alternating current voltage must not be used at all.

The controller is designed to run step motors with a maximal power input of 3 Ampere. Do not connect motors that exceed this limit!

Before you connect the motors you have to adjust some parameters as the motor power input for example. The manual will tell you in detail how to make these settings.

Pay attention that you must switch off the controller before you connect any accessories! Otherwise you might cause damage of the controller or the connected accessory.

1.4 The central controller unit at a glance

The LFE Photo's front obviously shows you the master switch and the terminal for the hand controller box. The sockets for AG-video, DSLR, Focus, and ST-4 let you connect optional accessories. The little switch above the hand controller box socket is needed to update the controller's software. The function is explained over here .

At the rear there are the connections for power supply and the two motors. There also are sockets for the encoders, LF-extension, PC connection, and the LAN-socket. An extra chapter will tell you how to connect accessories.

1.5 The hand controller box at a glance

What the hand controller box looks like:

1: FireWire socket to connect the optional GPS-mouse

2: LED lamp that can be switched on and off by the menu switch

3: FireWire socket for future accessories

4: SD-card slot

The right hand switch serves to set the speed. You can also use it to enter into the three menus below . If you set it to 2x, top, and press the left switch upwards (push button mode), the LED will blink once. You give a wanted command by using the corresponding direction push button. To enter into menu 2 and 3 you set the right switch to 8x or 16x. The LED will blink twice or three times to confirm if you push the left switch upwards.

If you press the buttons RA+ and RA- or DEC+ and Dec- at the same time they will invert their function. This change of the push buttons does not affect the display menus in any way.

1.6 The LittleFoot Photo DVD

The LFE Photo DVD contains the catalog of objects, the SkyAgent data bank with the corresponding SD-writer, and a link list that shows important pages in the internet. You also find all drivers, files and programs needed to operate the controller.

2 Putting into operation

2.1 Before the first start-up

What must you pay attention to before the first use?

As power supply you need a controlled AC-DC converter with a voltage from 12 to 30 Volt. **Important!!** in case you intend to run the controller with a voltage more than 14.5 Volt you must remove the link between pin 3 and pin 4 in the plug of the power supply cable. Before you connect the motors to the controller the setting of the controller's parameters, first of all the correct motor current, has to be done. **Please do not connect the motors for a test run before. You might destroy them.** How these settings are made is told later in the display manual.

2.2 How to use the menu of the hand controller box, description of the LED colors

There are 3 menus in the software of the hand controller box. These can be activated using the speed switch (2x = menu 1, 8x = menu 2, 16x = menu 3)and the left switch of the box (pushing it upwards the left switch works as a push button). Corresponding to the switches position the display shows the functions of the direction push buttons. The LED will show a quick blink once, twice or three times. Have a look at the menu's functions:

Menu 1:

Left = Focus (-)

Right = Focus (+)

Up = Focus Speed

Low = Entry into the display menu (explanation in detail over here)

Menu 2:

Left= IntellyTrack OFF

Right= IntellyTrack ON

Up=Toggle Guide Rate

Low=Sync to Encoder (if the option Encoder is not enabled the command „Park Mount“ is given over here)

Menu 3:

Left = PEC off

Right = PEC on

Up = Start/Stop PEC Training

Low = Invert GOTO DEC direction

The occupancy of the hand controller's menu depending on the switch position is shown on the display. Also have a look at the option *HC Menu Info* of the display menu.

The LED colors:

Red on = PEC active

Red off = PEC deactivated

Orange on = Push button pressed

Orange blinks = Menu

Green blinks for 10s = PEC training starts

Green on = PEC training in process

2.3 Connecting a PC via USB/RS232

You find multiple options to connect a PC that can be used at the same time. If you use the LFE Photo adapter and a common USB cable to connect the controller to the PC the terminal will be identified as a new hardware after you switch on. You will be asked to install a corresponding driver, this is to be found on the LFE Photo DVD as „Driver". After installation the controller will be recognized as Com-Port and you can apply any program that supports the LX 200 protocol. If you use „Windows Vista" as operating system the USB driver will be installed automatically, you do not need the DVD for this.

If your PC still has a 9-pole serial interface you may use this for connection as well. You find the occupancy of the pins over here.

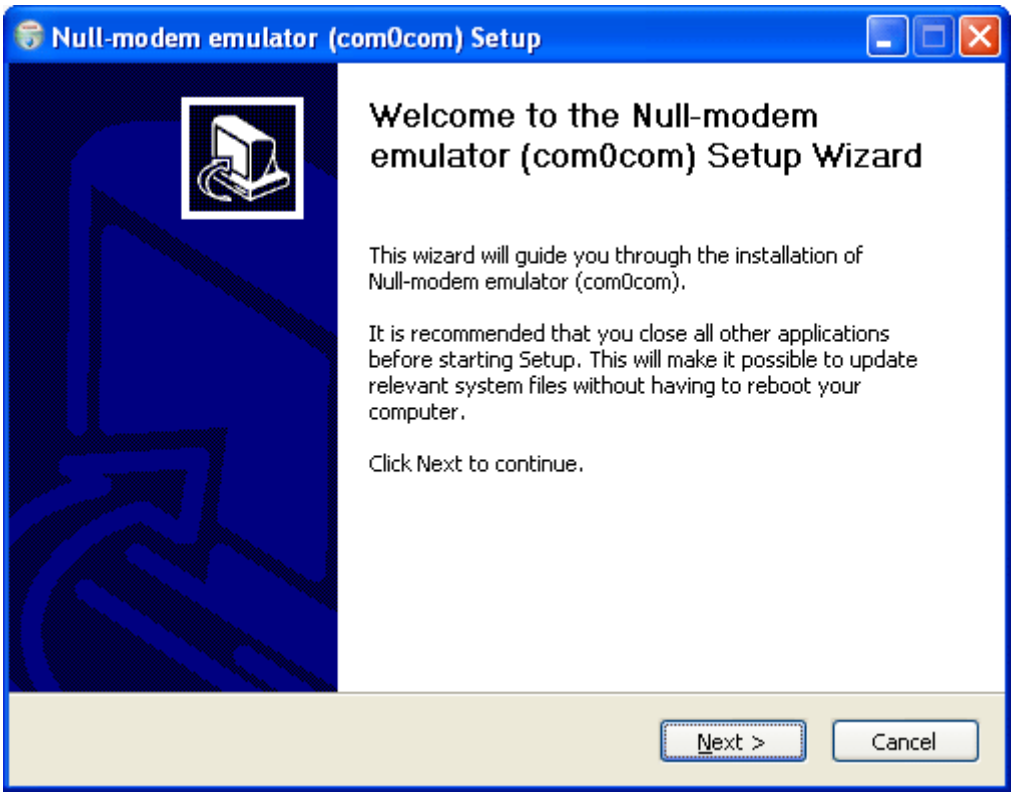
2.4 Connection via network/internet

The LittleFoot Elegance Photo has an Ethernet (LAN) terminal on his rear surface. By this the LFE Photo can be connected to the network and be used to communicate worldwide. To enable a communication via the local network or the worldwide internet some things have to be configured and installed in the controller itself (look here,) and the PC. As you already found the description of the controller's configuration in the display's manual, we shall now tell you about the configuration for the PC.

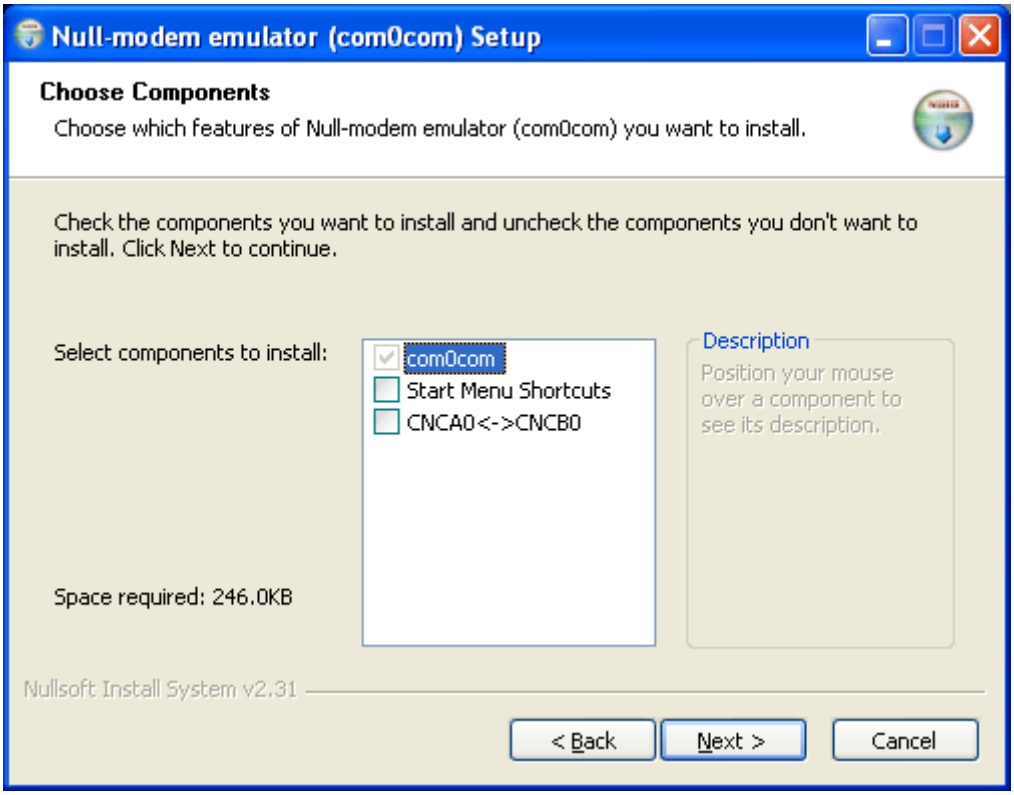
In the subdirectory „Drivers“ of the LFE Photo DVD you find the software package „LAN“ that must be installed to communicate via the TCP/IP network. The software needed contains two parts:

1. The driver software for the virtual COM Port (Setup.exe)
2. The LittleFoot Elegance Photo LAN Connector (ElegancePhotoConnector.exe)

The first step is to install the virtual COM Port driver. To do this invoke the file Setup.exe

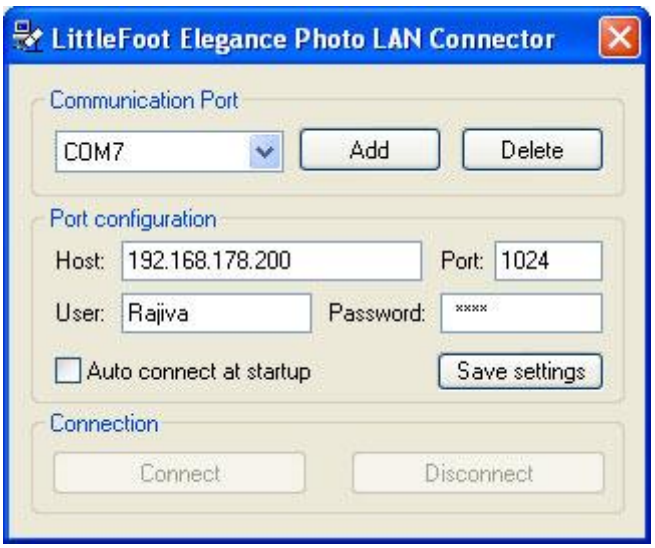

Null-modem emulator (com0com) Setup
Welcome to the Null-modem emulator (com0com) Setup Wizard
This wizard will guide you through the installation of Null-modem emulator (com0com).
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

After the click on „Next“ you will be asked which components should be installed. You can remove all optional ticks as the LFE Photo Connector will perform configuration and installation of COM ports on it's own.


Null-modem emulator (com0com) Setup
Choose Components
Choose which features of Null-modem emulator (com0com) you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
com0com
Start Menu Shortcuts
CNCA0<->CNCB0
Description
Position your mouse over a component to see its description.
Space required: 246.0KB
Nullsoft Install System v2.31
< Back
Next >
Cancel

This done continue by „next“ and the installation will be completed.

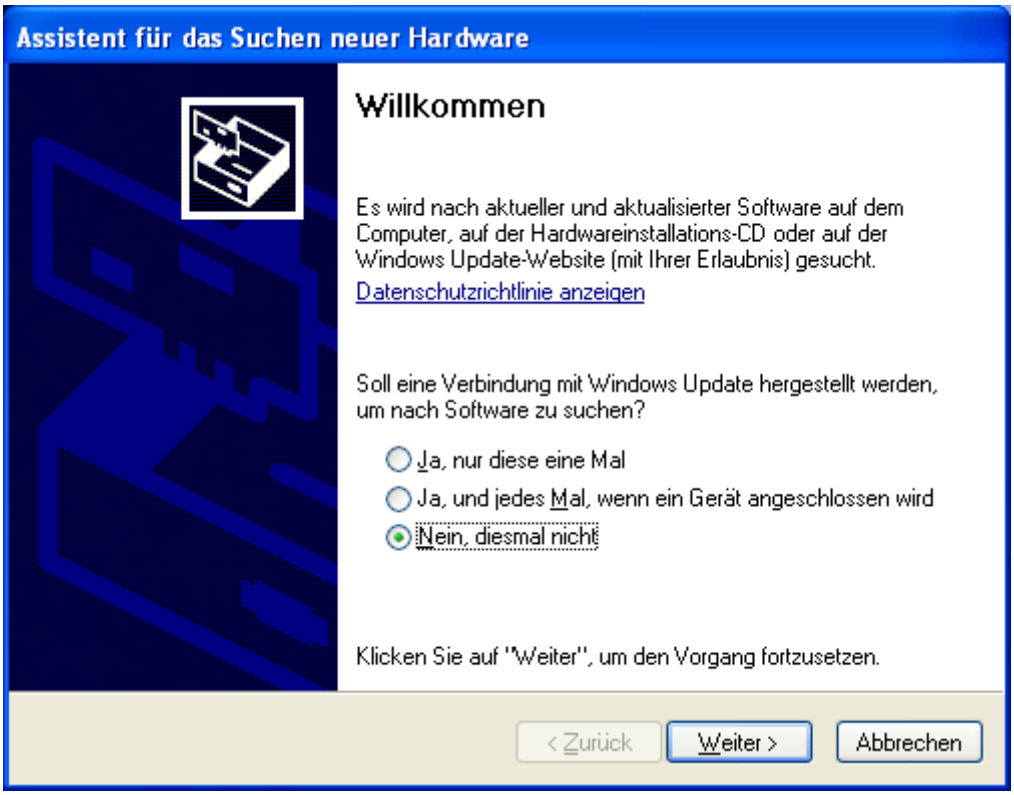
As a next step you will copy the file ElegancePhotoConnector.exe into any directory of the PC. There is no need for an installation, the program can be called directly from this directory.



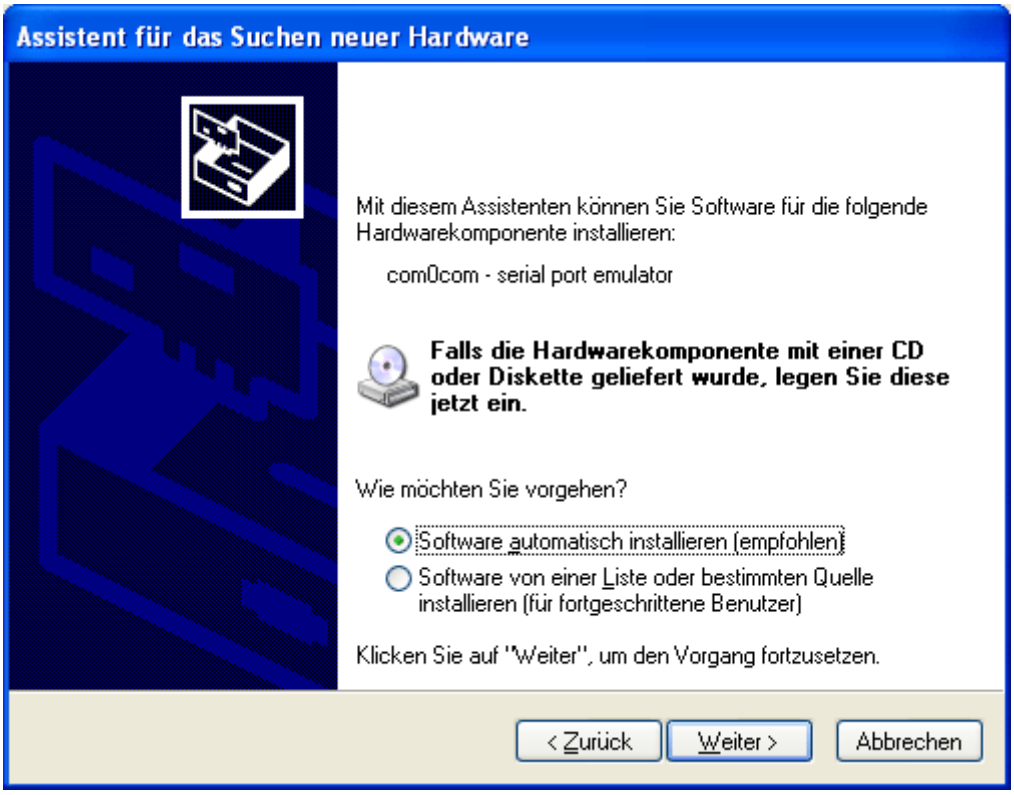
You need two things to establish a connection with the network:

1. COM Port that you can chose in your astronomy program
2. Information how the LFE Photo controller can be found in the network.

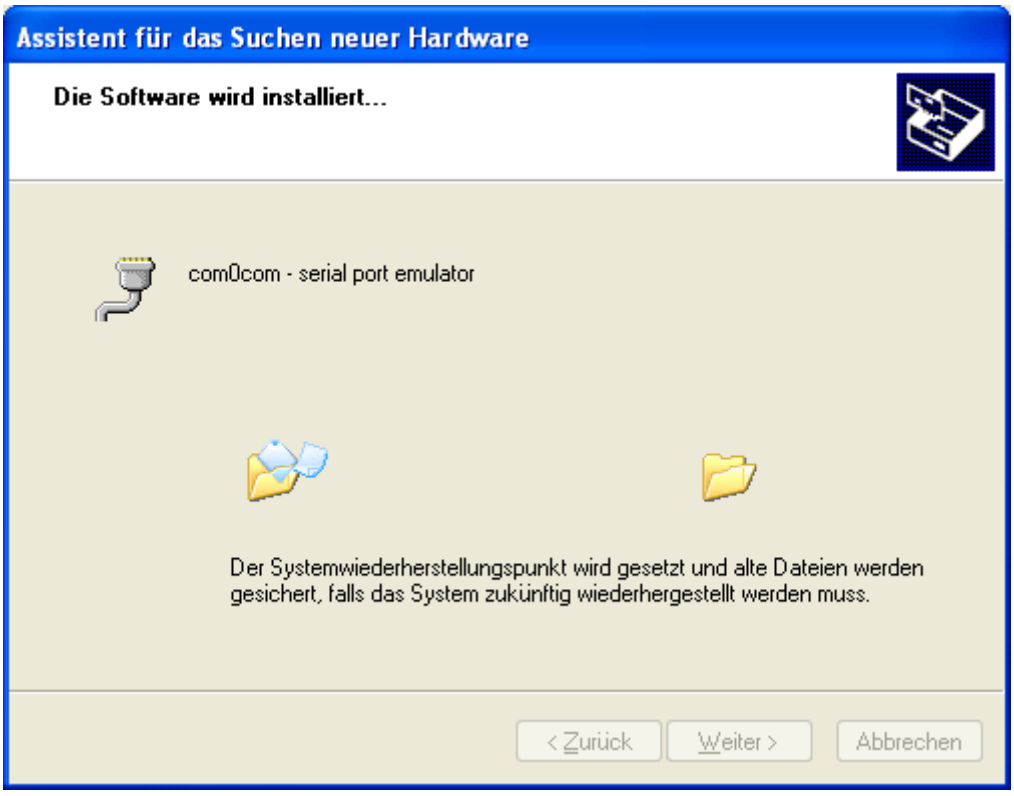
The first is done by a click on the button „add“. This will open a wizard to establish a virtual COM port. Attention!: In Windows Vista the awaited wizard will not be started in the standard way, Vista installs the components indipendently. Users of Windows Vista can go on reading here.


Assistent für das Suchen neuer Hardware
Willkommen
Es wird nach aktueller und aktualisierter Software auf dem Computer, auf der Hardwareinstallations-CD oder auf der Windows Update-Website (mit Ihrer Erlaubnis) gesucht.
Datenschutzrichtlinie anzeigen
Soll eine Verbindung mit Windows Update hergestellt werden, um nach Software zu suchen?
Ja, nur diese eine Mal
Ja, und jedes Mal, wenn ein Gerät angeschlossen wird
Nein, diesmal nicht
Klicken Sie auf "Weiter", um den Vorgang fortzusetzen.
< Zurück
Weiter >
Abbrechen

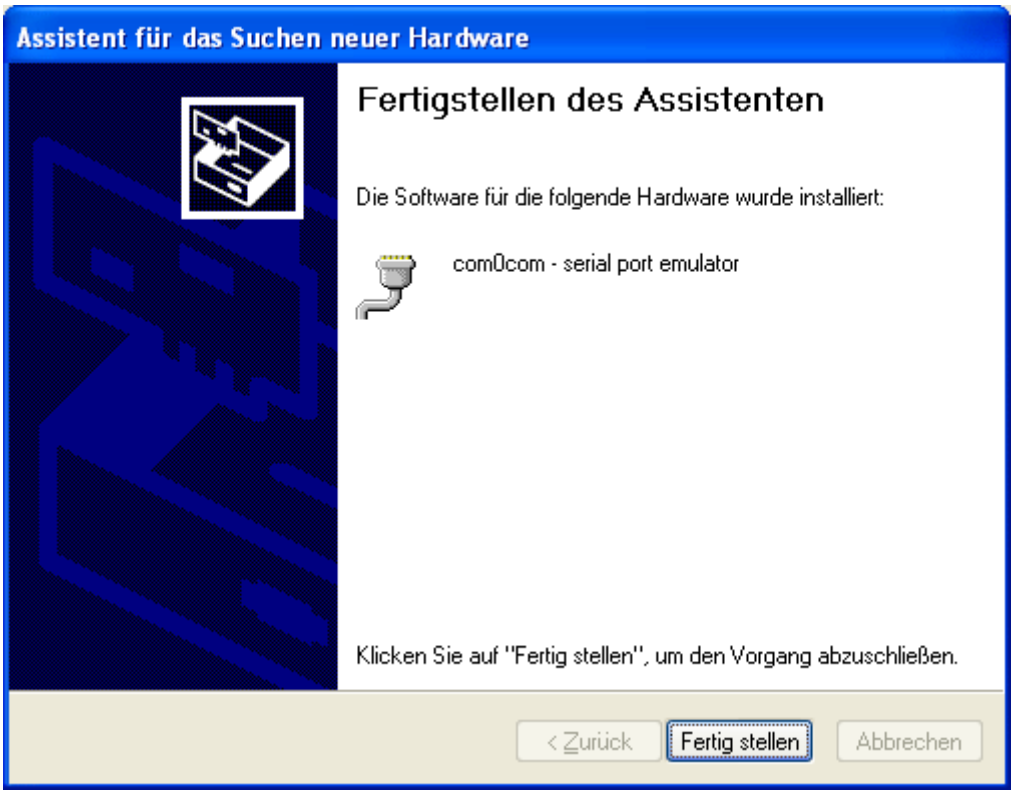
In this window you choose the option „Nein, diesmal nicht“ click on „weiter“.


Assistent für das Suchen neuer Hardware
Mit diesem Assistenten können Sie Software für die folgende Hardwarekomponente installieren:
com0com - serial port emulator
Falls die Hardwarekomponente mit einer CD oder Diskette geliefert wurde, legen Sie diese jetzt ein.
Wie möchten Sie vorgehen?
Software automatisch installieren (empfohlen)
Software von einer Liste oder bestimmten Quelle installieren (für fortgeschrittene Benutzer)
Klicken Sie auf "Weiter", um den Vorgang fortzusetzen.
< Zurück
Weiter >
Abbrechen

Here you choose the recommended option „Software automatisch installieren“ and go ahead to the next screen.


Assistent für das Suchen neuer Hardware
Die Software wird installiert...
com0com - serial port emulator
Der Systemwiederherstellungspunkt wird gesetzt und alte Dateien werden gesichert, falls das System zukünftig wiederhergestellt werden muss.
< Zurück
Weiter >
Abbrechen

In this screen the needed driver will be installed.


Assistent für das Suchen neuer Hardware
Fertigstellen des Assistenten
Die Software für die folgende Hardware wurde installiert:
com0com - serial port emulator
Klicken Sie auf "Fertig stellen", um den Vorgang abzuschließen.
< Zurück
Fertig stellen
Abbrechen

The assistant confirms the successful installation and starts the installation of the second driver. For every virtual COM Port you need two passages through the assistant, for the second time you proceed just alike.

After installation of the driver you are back in the window LittleFoot Elegance Photo LAN Connector. You can now fill in the data that have been configured at the controller on the corresponding boards. The board „host“ is for the IP address of your controller or your host-name if you are connected to the internet (DynDNS names allowed).

If no authentication is preset just leave the screens „User“ and/or Password empty. By using the option „Auto connect at startup“ you define when the connection network – controller shall be established. If there is a tick the connection to the network will just be established when needed, so if an astro program wants to communicate with the controller. You save the settings by „Save settings“.

Finally you click on „Connect“ and close the configuration window. This will not close the program but minimize it in the task strip where you have easy access to the LAN connector. To establish a connection to the controller you just choose the installed Com Port in an astro program of your choice. Anything else will be done by the LFE Photo LAN Connector.

3 Connecting accessories

3.1 Encoder

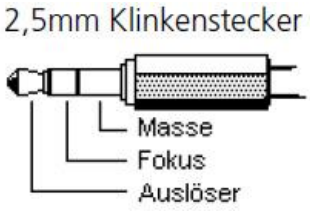
The Pin assignments for the encoder's socket is compatible to the encoders of „Sky-Commander“, „NGC-Max“ and „NGC-MiniMax“. The maximal solution of the socket is 0,33 arc seconds. You find an exact specification in the display's manual.

3.2 DSLR

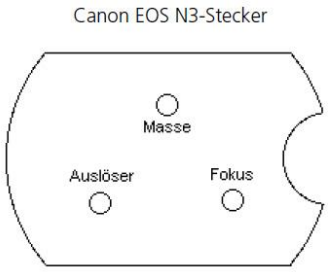
The 3-pole Mini Din socket is made to connect a digital mirror reflex camera. The inserted timer of the Elegance Photo gives you the option of remote control of series of expositions by the hand controller box. How to run the timer is to be found in the display's manual over here.

The socket's occupancy is to be found over here. As counterpart you need a Mini Din plug.

Canon DSLR cameras are quite common. Depending on the model the connection to the remote control is different. The occupancy for the 2.5 mm plug looks like this:



Some models need a so called N3 plug that has this occupancy:



3.3 Focus motor

Together with the Elegance Photo you can use stepper motors as well as DC-motors for focusing. As shown in the „Pin assignment„ you can connect stepper motors directly, for DC-motors you need a little extra circuit. The Elegance Photo supports the robofocus protocol to control a focuser with stepper motor. This can be activated by the Ascom-Platform. This enables easy automatic focusing by a camera – an invaluable tool for astrophotography. You find the exact configuration in the display's manual over here.

3.4 Autoguider

The occupancy of the auto guider's connection is to be found here. You might need an adapter cable to connect a guiding camera. Pin 1 normally is not occupied. If you need +5 volt for a guiding camera these +5 volt can be set on pin 1 by setting a jumper (JP-3) in the controller.

3.5 Video modul

This input is made to connect a video module like the one of Lechner company for example. The needed supply voltage is applied to this connection, so you do not need any further supply. You may connect any camera that has an analog video output like Watec, Mintron and models alike.

What you may use this module for shall be explained later in an extra chapter.

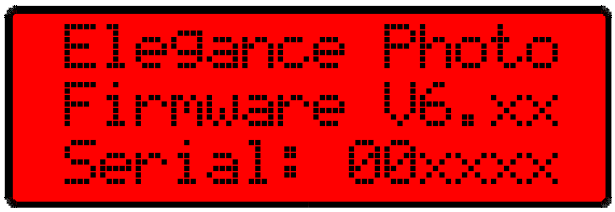
3.6 The LittleFoot Extension connector

The LittleFoot Extension connector is made to connect further accessories as it's occupancy tells you. The voltages 3.3V, 5V, 9V and 12V applied to this connection may be used to run external users. Make sure to use only equipment that does not exceed the power input of 500 mA per voltage.

The pin „Meridianswitch" is made to connect an inclination switch. By this the controller knows on witch side the telescope is situated after a German mount has been switched east – west. You find a practical application over here.

To connect a tube fan to the corresponding pin you need a little extra circuit. You find a link in the Linklist of the display's manual.

4 Display manual



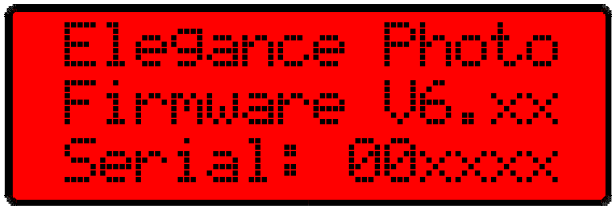
As the controller is mainly configured and operated by the display, the display manual is an important and major part of the entire manual.. An extra index will help you to find your way through the menus.

4.1 The functions at a glance

Menü 1:	Menü 2:	Menü 3:
User - Define - Delete Goto - Objekt - Planet - Catalog - - Scoll - - Select - Run Find - Run Tour - Home Pos. - Polar Align - Filters - Setup - Align Alt/Az - Update Show - Cords - Encoders DSC - Stepper Focus - Orientation - PEC State - IntellyTrack - Motor Power - Star Time - Sun cords - Extras - -Contr. Temp. - -Temperature - -Dewpoint - -Rel Hunidity SkyAgent - Travel - Identify - Field of View - Filters - - Star - - Double Star - - Starcluster - - Nebulae - - Galaxy - - Glx Cluster - - Undefined - - Others - - Magnitude Timer Control - Start - Settings - - Edit - - Load - - Save - Mirror Lockup *Filters* Exit	Tracking - Tracking Rate - Tracking Mode - - Startup - - King Rate - - Alt/Az - User Rate - Park Mount PEC - HC Mode - Factor - Aggressiveness - PEC Tracker Settings - Speed - - 2x Speed - - 8x Speed - - 16x Speed - - Goto Speed - - Backlash - Backlash RA - Backlash DEC - Ramp - Save Presets - RTC Settings - - Time - - Date - - Location - - Default - - Longitude - - Latitude - - Timezone - - Daylight - - DCF77 Sync - Encoders - - RA/AZ - - DEC/Alt Stepperfocus - Focus Mode - - Fast - - Slow - - Modes - - - Hand Control - - - LX200 Control - Speed - - Fast - - Slow - Backlash - - Value - - Mode - Microsteps - Motor Power - Set Limit - - Neg. - - Pos. - - Rev. Exit	Extras - Fan Control - Dew Heating - PC Mode - GPS Data - Ethernet - - IP Adress - - Router - - Netmask - - DHCP - - Port - - Security - - User - - Password - - Version - - Update - - Reset - Ext. Port - - Can - - Focus - - Tracking Display - Backlight - Contrast - Upd. Interval - Key Repeat - - Speed 1.....5 - Invers Mode - Reading LED - Heating - HC Menu Info - Version - Reset Controller - Visitor Mode - Mount Setup - - Motor Power - - - RA/Az - - - DEC/Alt - - - Booster - - Step Angle - - -RA/Az - - - DEC/Alt - - Gear Ratio - - - RA/Az - - - DEC/Alt - - Worm Wheel - - - RA/Az - - - DEC/Alt - - Axis Dir - - - RA/Az - - - DEC/Alt - - Load Setup - - - RA/Az - - - DEC/Alt - - Save Setup - - - RA/Az - - - DEC/Alt - - Presets - - - Load - - - Save - - - Load SD - Password - Security - Licence - Reset Exit

4.2 How to activate the display menu

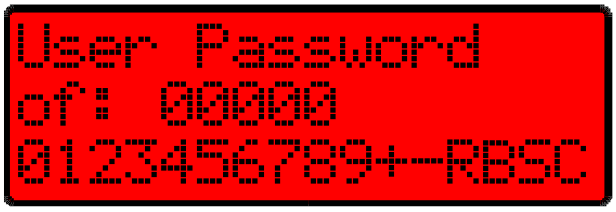
After you switched on the controller the display shows these information's



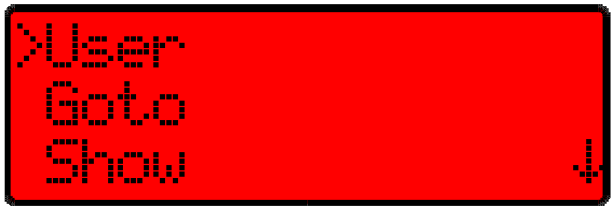
Firmware means the controller's firmware-version, not the display firmware. Underneath you see the serial number of the controller. The Elegance Photo uses an own menu to show the options and not the start-display any longer like the other Little Foot products did.

To activate the display modus you set the hand controller's speed switch on ***2x,*** and start the hand controller's menu by use of the menu push button. Then by using ***DEC-*** you switch into the display menue. This is always the starting point to work with the display.

If the visitor modus or the controller's security is activated a password is asked. Here you put in your personal password or the master password that has been delivered with the controller or the firmware.

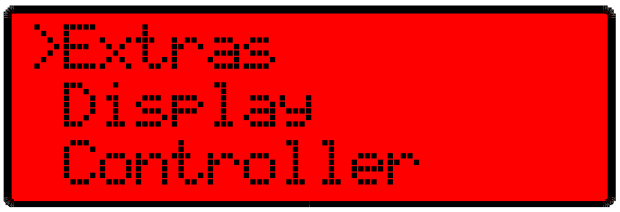


If the password is valid or no security is activated master menu 1 is to be seen. This is always the starting point for work with the display.



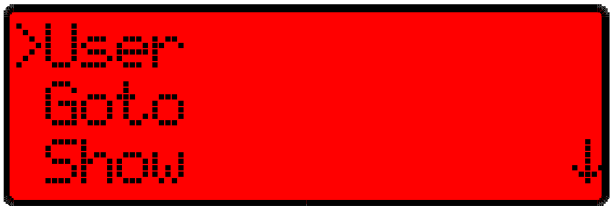
Setting the speed switch on **8x** or **16x** will activate master menu 2 or 3. This is also the way to switch from one master menu to another.

This is what the display shows for master menu 2 and master menu 3.



4.3 How input is made

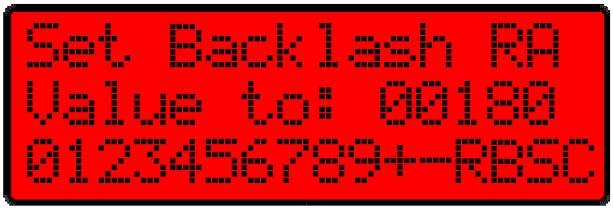
Input for the display is done by the hand controller box. Use the push buttons as follows for navigation in the master- and sub menus. ***DEC-*** leads you downwards ***DEC+*** leads you one step upwards in the menu. ***RA+*** leads you to a sub-menu ***RA-*** back to the superior menu. The actual input is shown by **„>**“ . If you see arrows pointing upward or downward on the right hand side further menu points are to be found above/below. By click on **Exit** you leave the display modus. The display from picture 1 is to be seen again.



There are two kinds of dialogue for the input. Look here:

4.3.1 Free input of values

This is what the dialogue looks like:

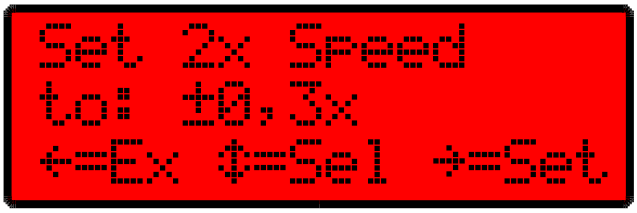


Line 1 tells which function is to be changed. Line 2 tells the actual value. One number is underlined, this is the number that is changed right now. There is another cursor in line 3 on the display screen. The chosen sign is shown blinking. Values from 00000 to the maximum possible can be put in. If you set a value higher than max it will be rounded off to the maximum. For the input there are different ways. You can select the number to be changed in line 3 by pressing on **RA+** or **RA-**. The selected sign will blink. A press on **DEC+** will save the value and let you proceed to the next decimal. By pressing on **DEC-** you can move the decimal cursor to the right.

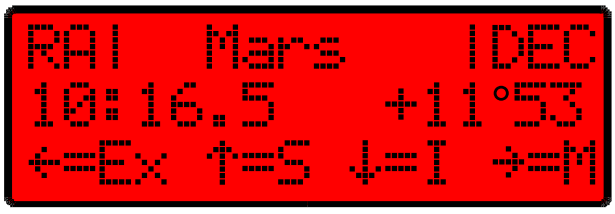
There is another way to make the decimal cursor move. Use the push buttons **RA+** and **RA-** to move the cursor under **B (Back)**. Now you can move the little cursor under the decimals to the left by **DEC+** and to the right by **DEC-**. The signs **+** and **-**let you make the decimal bigger or smaller by steps of 1. Use **S** to save the value or **C** to cancel it and to return to the next higher level. **R (Return)** is used to go one step back in the **Fototimer's** input. This will be explained in detail later on.

4.3.2 Select preset values

This is what the dialogue looks like:

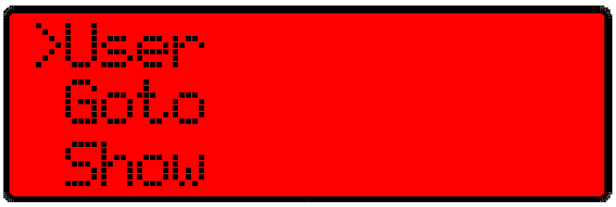


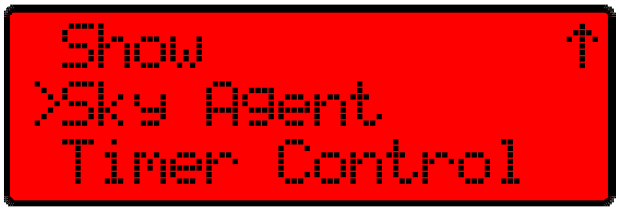
In this dialogue you can just choose preset values, here 0.3x, 0.7x und 1x. You select the value using the push buttons ***DEC+*** and ***DEC-***. ***RA+*** will save the value and make you leave the menu, **RA-** cancels the input and leaves the menu. There is another variation of the selecting menu. It is to be seen here and operated in the same way.



4.4 The display menus

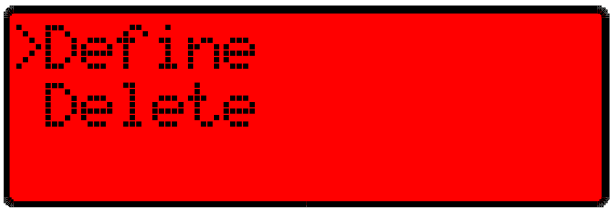
4.4.1 Menu 1: User, Goto, Show, Sky Agent und Timer Control





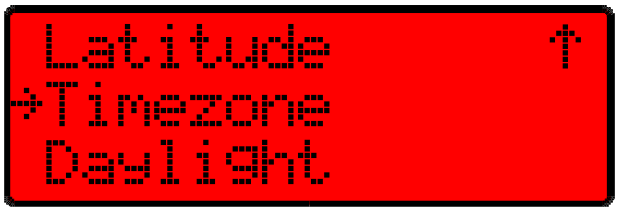
4.4.1.1 Submenu User

The User submenu gives the option to name shortcuts to menu points for direct access. For example if you have to change the time zone frequently (Menu 2/ Settings/RTC-Settings/Location/ and pressing four further buttons) the User menu offers you an easy way. There are the points Define and Delete to be found in the menu.

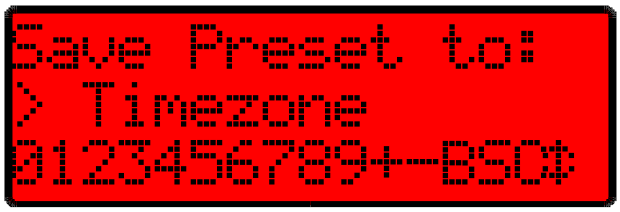


After choosing Define the screen looks like this:

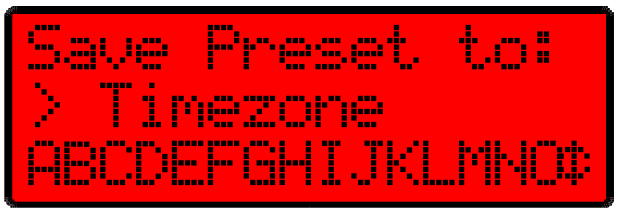
An arrow is to be seen in the top line. You can move it to the selected function.



As an example I choose the setting of the time zone.

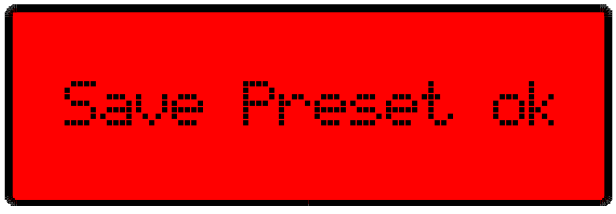


After choosing the function you switch to the input-mode. Here you can name the shortcut to the function that has actually be chosen or accept the proposed name.



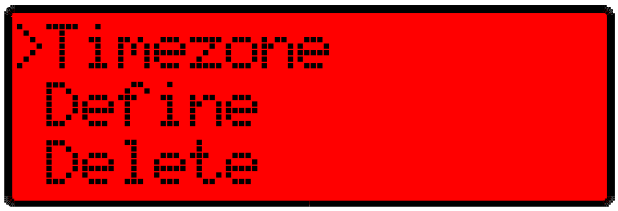
As you can see you can switch to the input of letters by a click on the right arrow. You can get access to four further lines for input. Up to 13 signs can be written. You save the names choosing S in the first menu.

After selecting S the display looks as this.

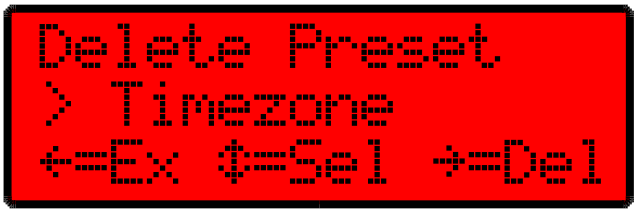


and then returns to menu 1.

If we take a look at the User menu now we can see the new shortcut. Now we have direct access to the function Timezone in the User menu.



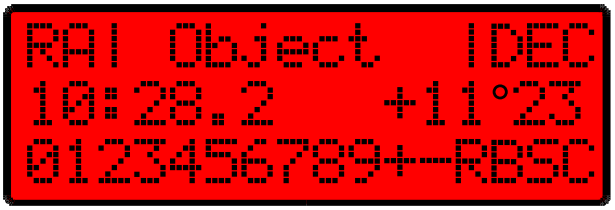
The ***User*** Menu offers the space for ***10 Shortcuts***. To delete an input you go on **Delete** in the **User** menu. The screen will look like this. **Sel** will select the shortcut and **Del** will delete it.



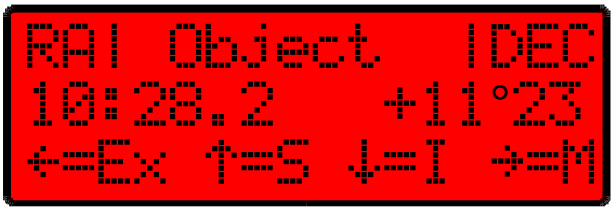
4.4.1.2 Submenu Goto

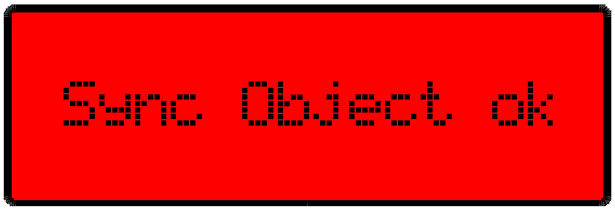
The Goto submenu contains 7 further menu items, Object, Planet, Catalog, Run Find, Run Tour, Home Pos., and Polar Align.

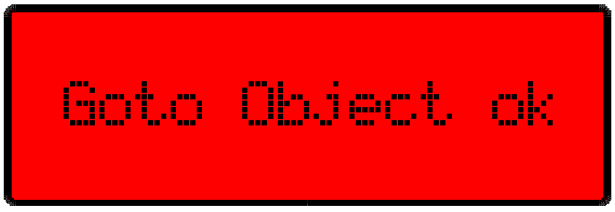
The object function lets you make a Sync to any objects / coordinates you like or point the instrument to it by Goto.



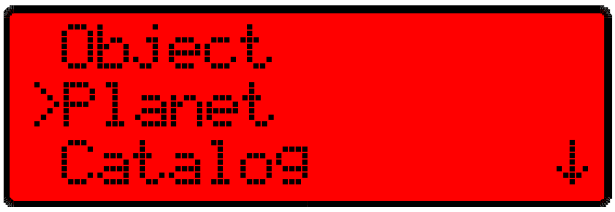
After input of the coordinates and Save the display will look like this. Use **S** for a Sync onto the coordinates or **M** to point there by Goto. The function will be shown by a confirmation, if you choose Goto the mount will start to move.

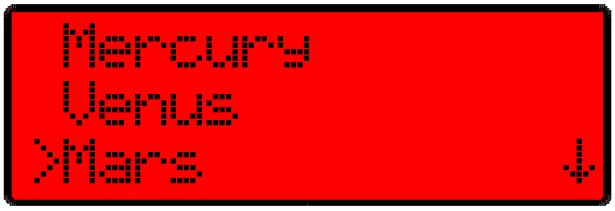




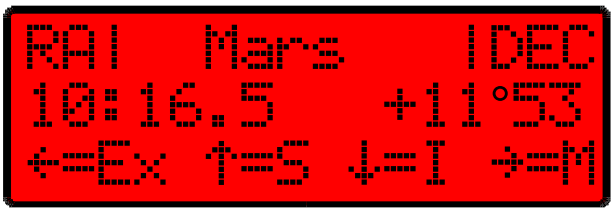


Next in the menu there is **Planet** . Here you can make a Sync onto all planets of the solar system or point at them by Goto.

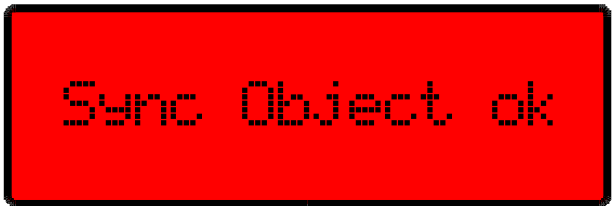


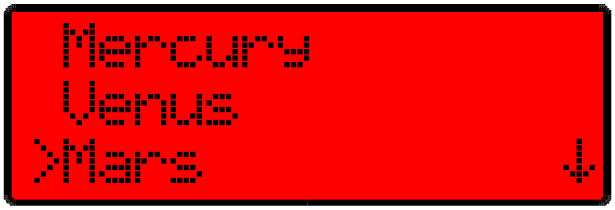


As an example I show how it works by a Sync on mars and thereafter a Goto to saturn.

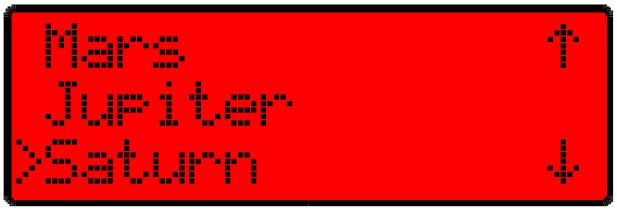


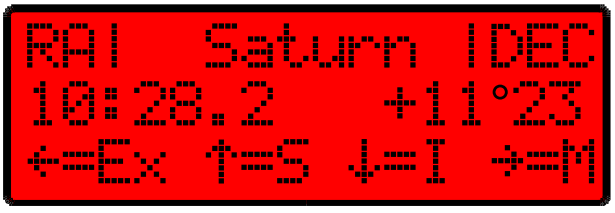
By ***S*** you make ***Sync*** on mars. Sure that the telescope should point at mars too. After input **S** you see this message. The display will return to the planet menu.



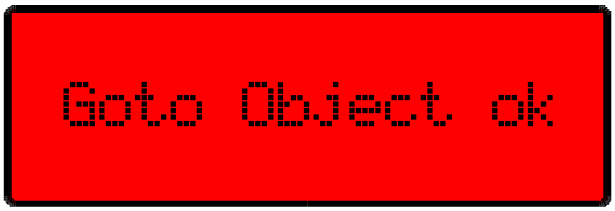


Now we choose saturn.

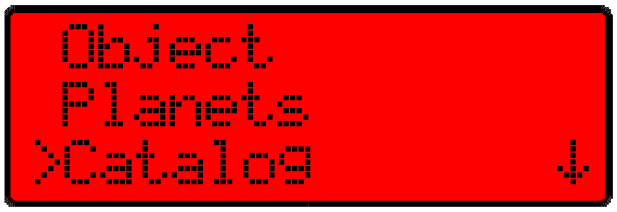




Input **M** lets us see this message and makes the telescope move from mars to saturn.

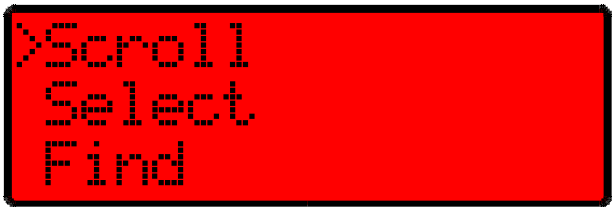


The ***I*** button works as a double function key. First it serves to define the object's coordinates as an active target, second extra information concerning the objet are shown.
If no extra information concerning the object is available the screen remains as it is. There is no further information available for planets, this will be different with the Goto catalogues that we start to talk about right now.

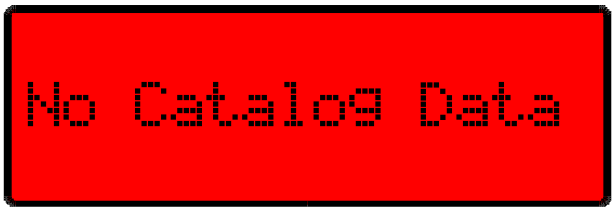


Now we shall take a little more time to have a look at the subject **Catalog.** How the data are written onto the SD card, this I shall describe in the chapter SD-writer. The subject **Catalog** contains three menus, **Scroll, Select, and Find** the names already give a hint to the use. Both submenus make use of the same file. One chooses the object scrolling through the catalog the other by input of the object's number the third by definition of a Find mask and then scrolling for common characteristics. The change from **Select-** to **Scroll** is made easy this way: If you choose an object by Select, M57 for example, the same object will be shown as selected in the scroll-modus too. So you can choose any start position you like in the scroll catalog. This is an inestimable advantage especially in big catalogs.

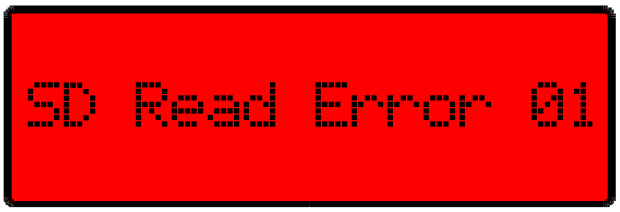
So let's start with the **Scroll** menu.



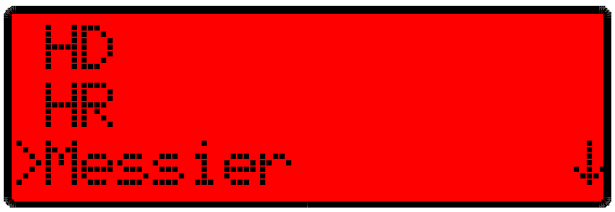
If there is not any SD card in the slot you will be told:



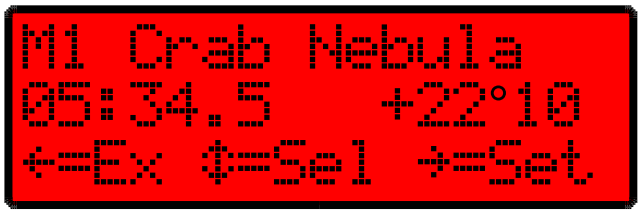
If the card in the slot does not contain any object catalog you will be told:



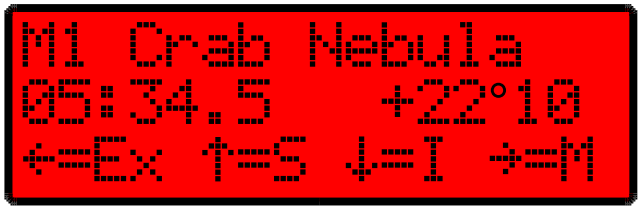
I get this picture. The picture depends on the catalogs written on the SD card of course.



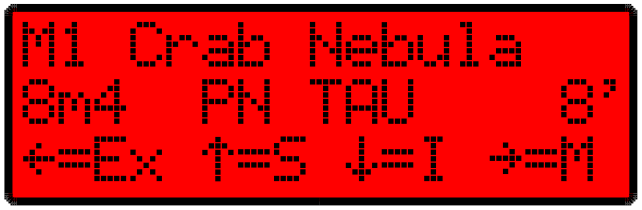
After change to the Messier catalog the display looks like this:



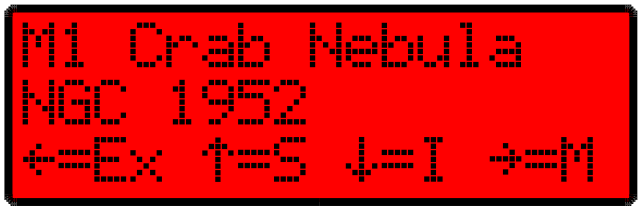
By ***Sel*** you can scroll upwards and downwards in the Messier objects. By ***Set*** you get further information about the chosen object. Now you have the same options as in the planet menu, S = ***Sync*** , M = ***Goto***



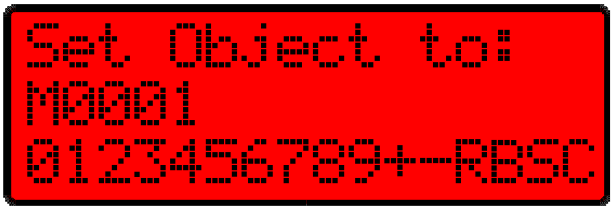
By ***I*** we can get further information about the chosen object. Here it is for example the ***Magnitude***, the species ***Planetary Nebula***, the constellation and the size. Another click on **I** shows another block of information.



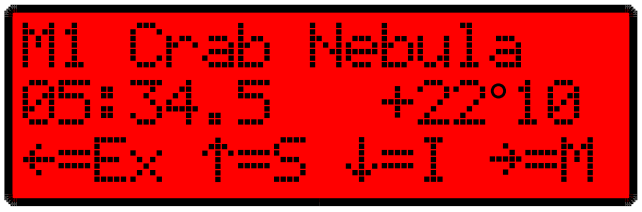
Here we see M1's NGC number. The number of information pages and what they look like depends on the information that the SD card contains.



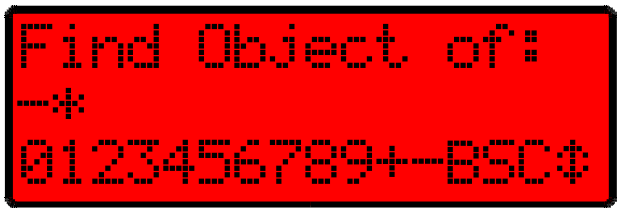
Now we have a look at the ***Select*** menu. Once again we choose the Messier catalog. The screen looks like this:



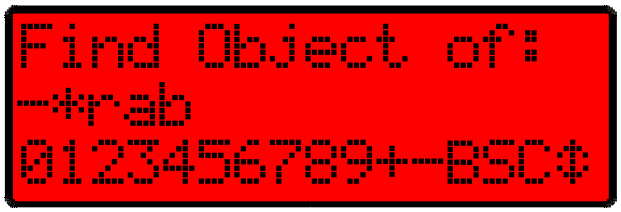
Here you can set the number of the object. After input 1 and saving it by **S** the screen will look like the one we know from the Scroll catalog. Now you have the same options as in the Scroll catalog.



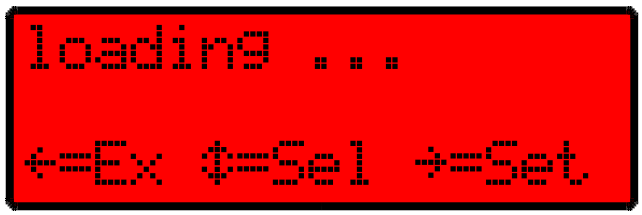
To show the last menu **Find** we once again choose the Messier catalogue. You can define a Find mask. Valid space-holders are “*” and ”?”. The star is substitute for a multitude of letters the question mark substitutes a single letter. The Find menu distinguishes capital and small letters. The input screen looks like this:



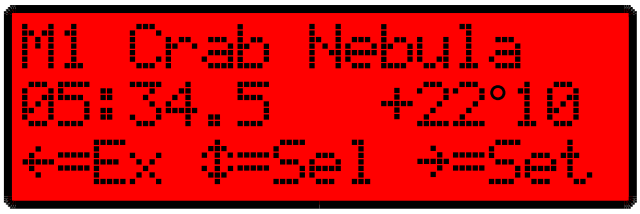
There is a special purpose of the ”-” at the beginning. If it is unchanged only the “name” sector is searched, if it is converted to a “+” the “information” sector is searched too. So you can look for constellations, magnitudes, and other information to be found in the information sector. The space holder “*” mentioned above is proposed but can of course be changed. As the **Find** menu is rather complex I shall give you an example of how to use it.



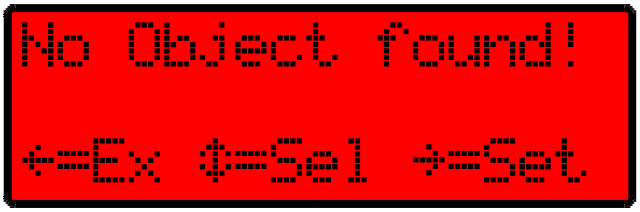
As an example once again I want to find the crab nebula of the Messier catalog. As I do not know whether I should start with a capital letter or not and where the name is to be found in the text I substitute letter by the space holder “*”. So all signs before “rab” are allowed. There is no need for a “*” after “rab”, as we only look for common signs up to “rab”. “*rab*bula” would also be possible and make us find the name. After input of the **Find** text and confirmation by **S**tart searching starts and this screen is to be seen. Searching can always be stopped by **Exit**.



After a moment the display changes and the first hit is shown. It is Crab Nebula that we looked for. By **Set** you get further information concerning the object and you continue as in the **Scroll** menu.

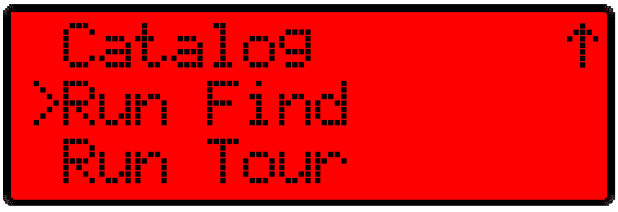


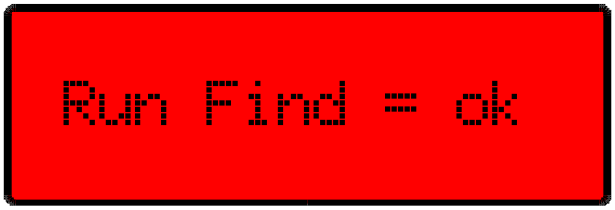
By **Sel** you can continue to search up and down. Further hits will be shown. If there is no further hit this screen is shown.



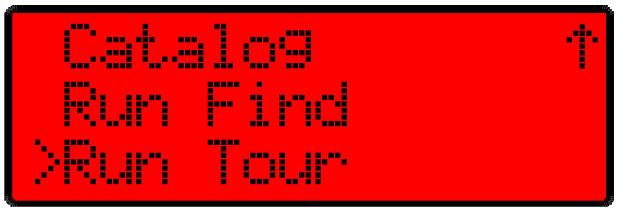
Now let's talk about the next point in the **Goto** menu, it's ***Run Find***.

Run Find activates the so called function. It helps to localize an object in the eyepiece (square search pattern).

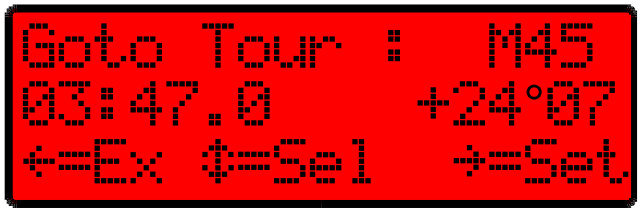


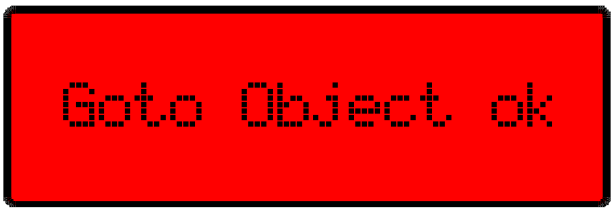


In the menu ***Run Tour*** you have access to a list of coordinates for a ***Goto-Tour***. These can be established by „Goto Tour Editor“ or be transferred to the controller using the function „PC Mode“.

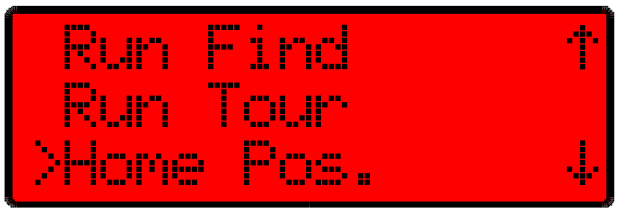


Here you see the transferred data for M45. ***Sel*** let's you scroll through the data of the tour. ***Set*** initiates the Goto to a choose object and is confirmed on the screen.

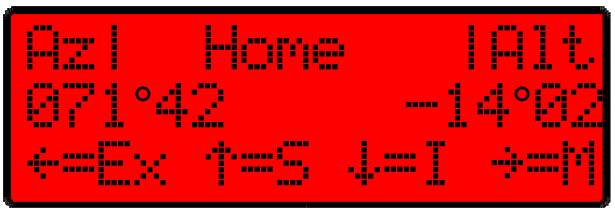




Home Pos. gives you the option to define a parking position, to synchronize on this position and make Goto to this position.

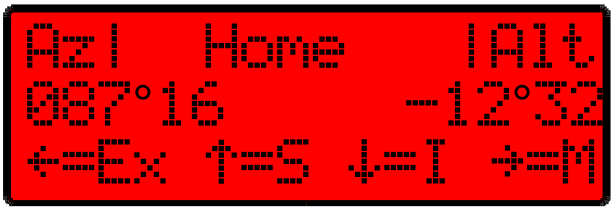


The screen looks as with the other Goto screens but with one difference. “I” does not mean Info but Initialise, thus defining the parking position coresponding to the actual telescope position.

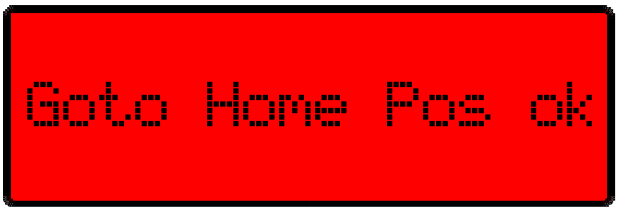


Do it this way. Put the telescope / mount into a defined position, for example that you can close the observatory's / shelter's roof. Now **initialize the parking position** by confirming "I".

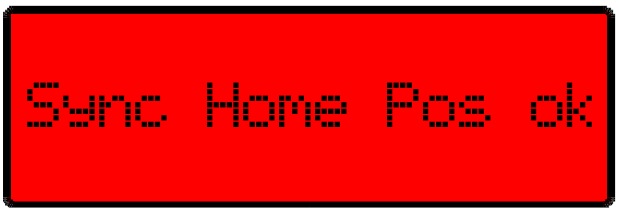
This is the confirmation on the screen. Then the display changes to a superior menu. If you invoke again you see the changed coordinates.



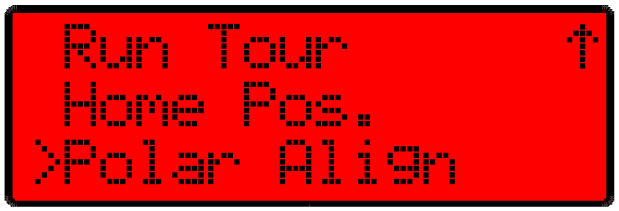
If you want to make the mount go to the Home Position you select the menu and make the move (goto home pos.).



The telescope goes to the home position and you can for instance close the roof. As well you can use the home position to make a **Sync** as the initializing saved the coordinates in the internal EEPROM permanently.



After that you can immediately make a Goto to an object.

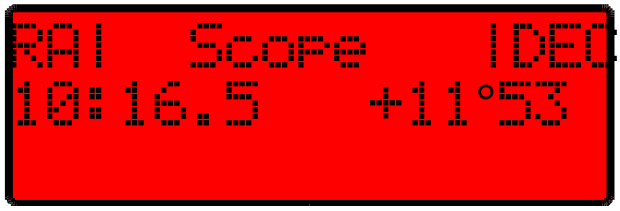


The Polar Align menu can not be used at the moment, it will be available again soon!

4.4.1.3 Submenu Show

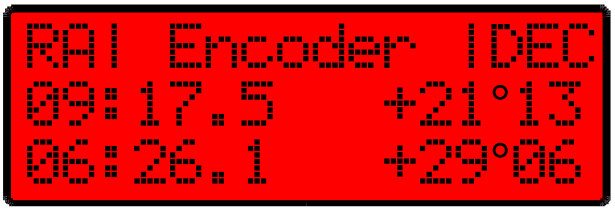
As it's name already indicates the submenu Show lets you see some information. These items are ***Cords, Encoders, Stepper Focus, Orientation, PEC State, Intelley Track, Motor Power,*** **Startime**, **Sun cord, and Extras**. I shall demonstrate the different screens in the sequence of the menu.

Cords shows the actual coordinates of the mounting.



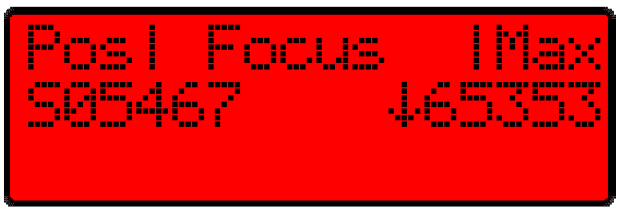
If you choose **Encoders** the 2nd line shows the coordinates that the encoders are pointing at.

The 3rd line of the display shows you the coordinates of the object defined before. So Show Encoders can be used to substitute digital setting circles as the intended and the actual position are shown.



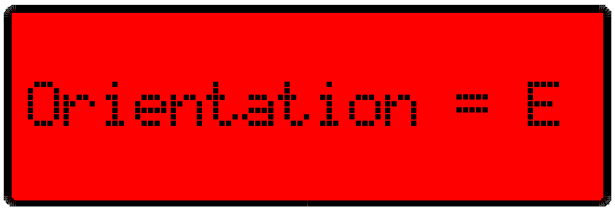
The object /target coordinates can be defined like *this.*

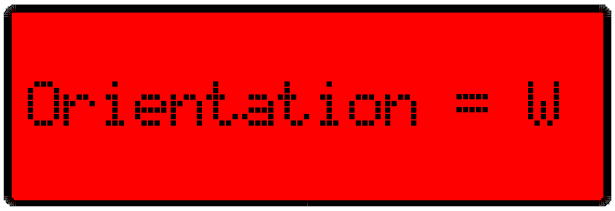
Stepper Focus in the menu gives you information concerning the focuser. If you invoke the subject this screen shows up. You left the Display menu and activated the *HB 1 menu* automatically.



The 1st letter 'S' (slow) or 'F' (fast) in the 2nd line tells you the actual focusing speed. Just behind you find the actual focuser position. On the right hand side an arrow upward or downward shows the focus motor's direction and the limits of focus positions. You leave the mode by pressing the Menu button.

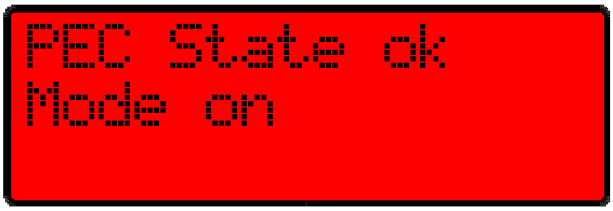
Orientation shows the position of the telescope's tube. After passing the meridian the value changes automatically if the mount has a corresponding switch.

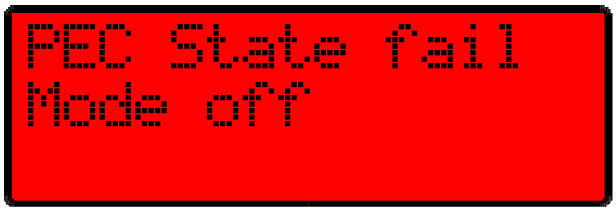




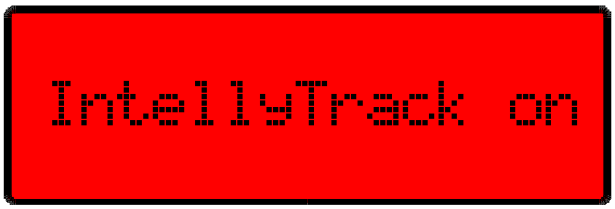
PEC State shows the PEC Status and connection.

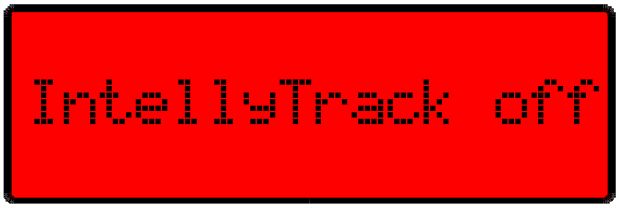
Such screens would be possible.



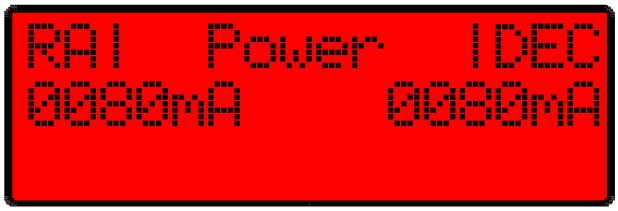


IntellyTrack tells you if this function is active or turned off.

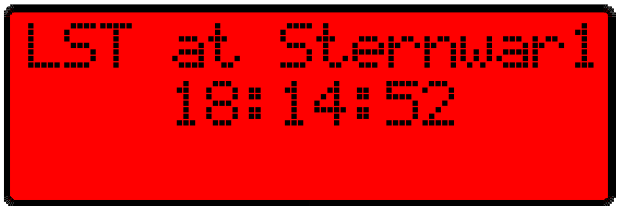




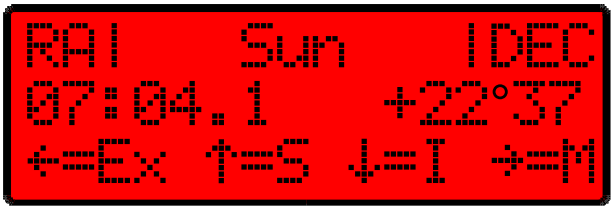
Motor Power shows the actual setting of the motor current. This is shown permanently, the controller works in normal mode.



StarTime shows the star-time for the position set in ***RTC Settings***/ ***Location / Default***. This information is permanent, the control works in normal mode.

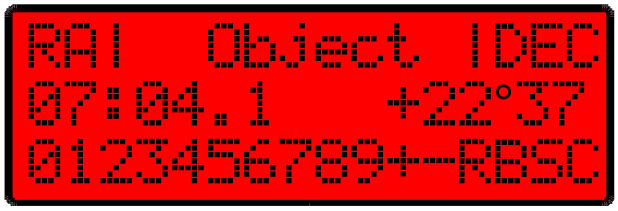


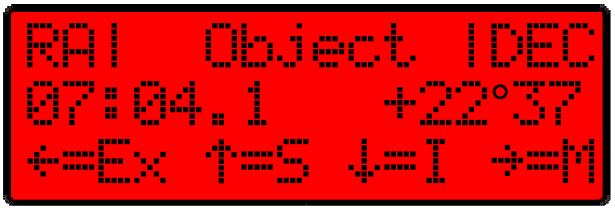
The last subject of the Show menu is "Sun cords" which shows the sun's coordinates. If you call this option you see a screen as for Goto. **You can make a Sync but no Goto for the sun here!**



If however you wish to make a Goto to the sun, for instance if you went from sun to Venus before, here is a trick how to do it:

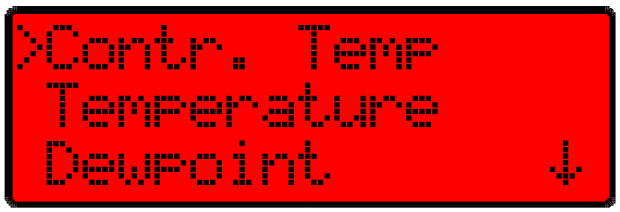
1.Call Sun cords.
2.Save the data temporarily by RA+. A Goto will not be started.
3. Switch to the menu Goto >Object The sun's coordinates are already to be found there.
4. Now continue as you are used to under Object and initiate a Goto if you want to.

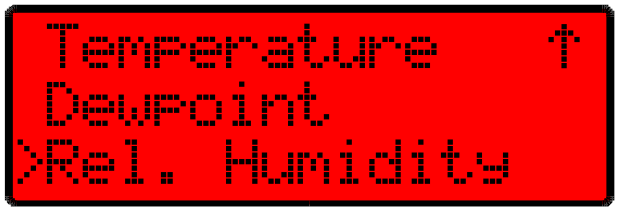




This way you can make a Goto to the sun but you are not likely to do it accidently.

The next subject **Extras** is another submenu containing the options **Contr. Temp., Temperature, Dewpoint, and Relative Humidity.**



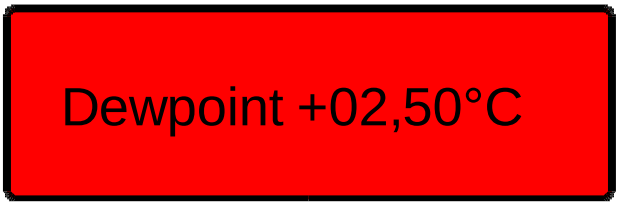


Contr. Temp. shows the temperature inside the controller's box. It is about the same as the temperature of the motor driver.

For the options **Temperature, Dewpoint, and Rel. Humidity** you need an extra external hardware (watch the *linkslist*). If the extra hardware is not connected question marks will be seen instead of the data.

Temperature shows the outside temperature if there is an external temperature sensor connected.

The value **Dewpoint** is computed using the values of outside temperature and relative humidity.

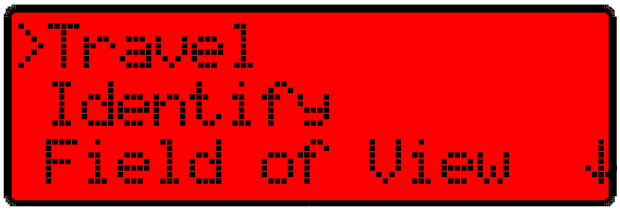


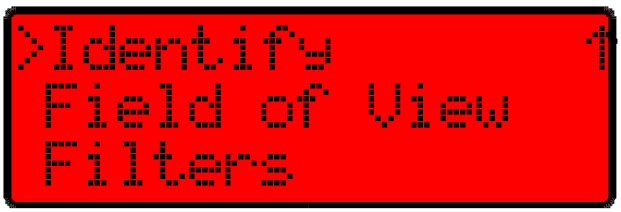
Rel. Humidity shows the air's relative humidity at the external humidity sensor.

4.4.1.4 Submenue Sky Agent

Sky Agent recognizes and identifies objects that pass by your telescope. To use this function you must have saved the object catalogs and the **Sky Agent** data bank on the SD card. The **Sky Agent** data bank must be established first. To establish and transfer the **Sky Agent** data bank there is a **SD Writer** that I shall describe in the chapter SD-Writer later on.

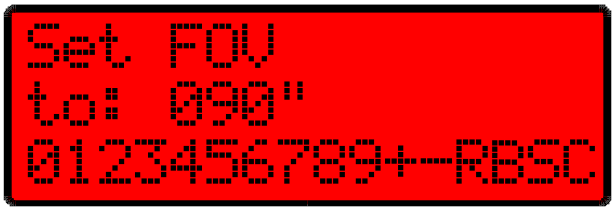
The ***Sky Agent*** contains four submenus ***Travel, Identify, Field of View,*** and ***Filters***



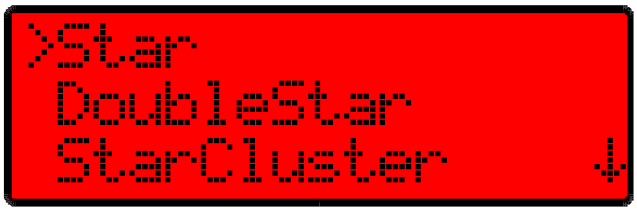


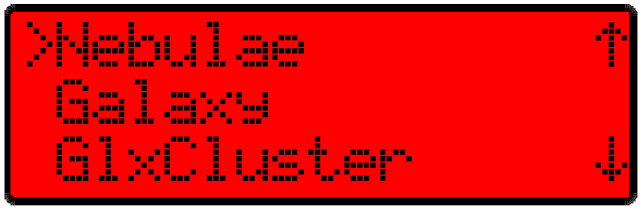
I start with ***Field of View*** and ***Filters,*** as they influence the amount of information given in the other menu points.

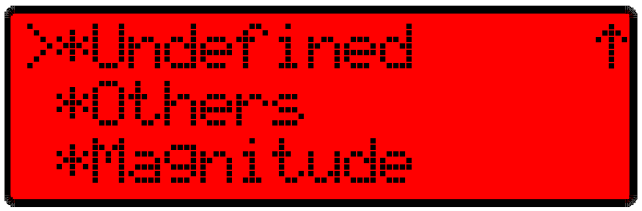
In ***Field of View*** you can set it's size in **arc seconds.** It should be about the same as the field of view of the optics you use, so only objects are indicated that are visible in the field.



Filters gives the opportunity to choose what you want to see or not in the ***Travel Mode.*** Whole species of objects can be rejected or you choose only objects of certain ***magnitudes.***

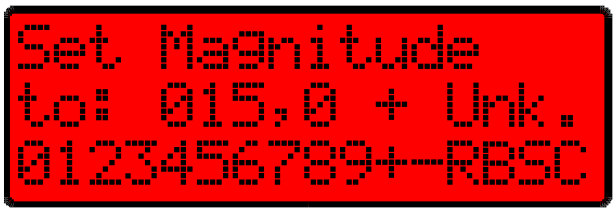






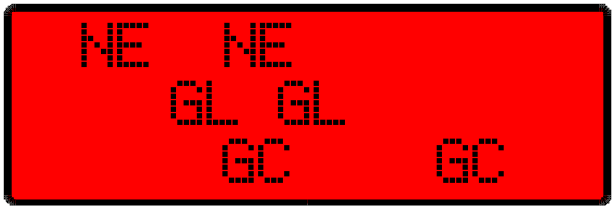
A star in front of the object class indicates the active filter for this class of objects. This means that this kind of objects will not be shown! This screen over here shows that all kind of objects except ***Undefined*** and ***Others*** will be shown. You also have to take care of the ***Magnitude.***

Now we proceed to submenu Magnitude.



Here you can set up to which Magnitude objects will be shown, 15 mag in this case. The buttons + or – give you these options. There are objects of unknown magnitude to be found in the catalog. This objects can be filtered by "+/- Unknown". You might like to set a magnitude filter but see objects of unknown magnitude. You can inactivate the filter by setting the Magnitude to 100 for example.

Travel shows the classification of the objects on the display that accord to the settings and restrictions of the menus. A have made a synchronization on M101, the FOV is set to 90 arc seconds. On the display you can see 2 nebula, 2 galaxies and 2 galaxy clusters.



These kinds of objects are shown in the Travel mode by those abbreviations.

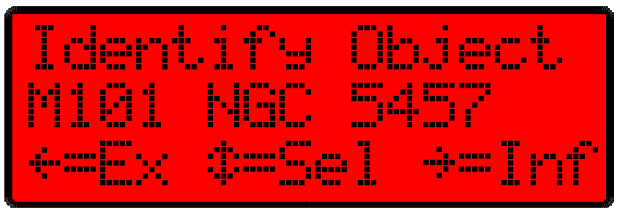
ST = Star, DS = Doublestar, SC = StarCluster, NE = Nebulae, GL = Galaxy, GC = GalaxyCluster, UK = Undefined, OT = Other

Nebulae contains all kinds of nebula, also star clusters, galaxies and so on.

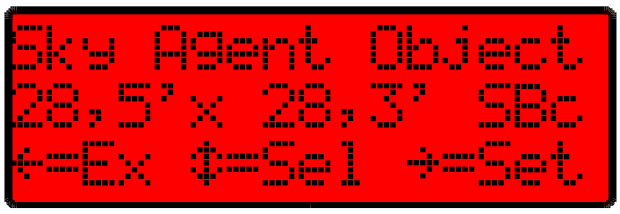
The objects shown on the display will move as the telescope moves (tracking). As the controller works in the modus „hand controller box“ the screen can also be influenced by use of the direction pushbuttons.

To (***Identify***) the objects we change to display modus and then to menu ***Sky Agent – Identify***.

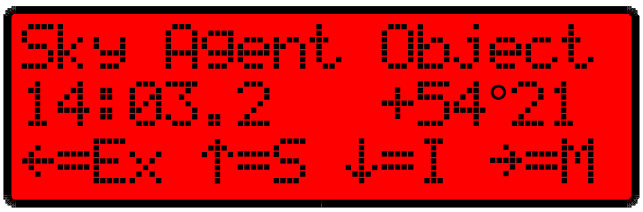
This is what is on the screen.

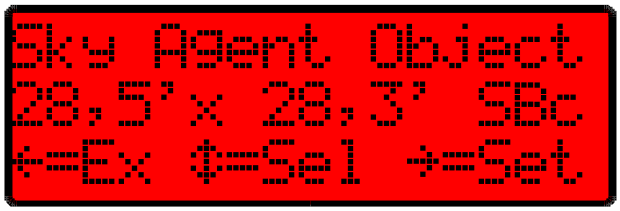


Because of ***Sync*** on M101 this galaxy was in the center of the display and is shown immediately. By ***Inf*** the information contained in the object catalogs concerning the objects can be shown.

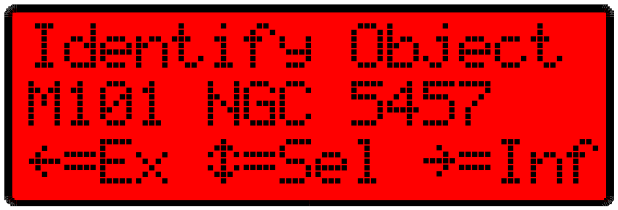


Using ***Sel*** you switch from one information to another. The ***Identify Modus*** unlike the ***Travel Mode*** shows all classes of objects to be found in the catalogs. By ***Set*** you enter a selective menu for further information or to initiate a Sync (S) on the object or a Goto (M).

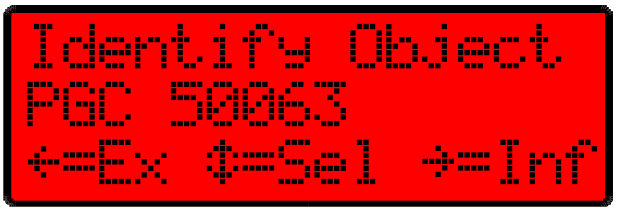




Now a take a step back to our start menu.



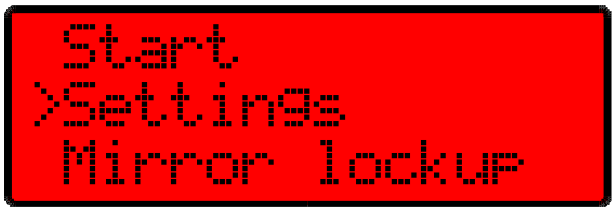
A click on Sel starts a spiral search that gives access to the information about close by objects. This will also be active if the menu did not show any object in the center of the display. ***Filter*** settings will be respected when spiral searching.



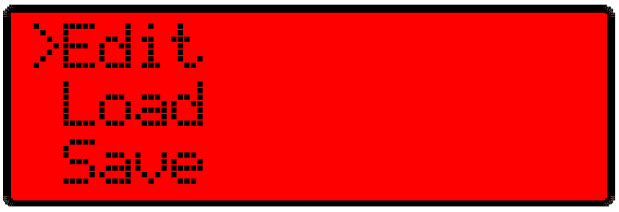
Here we find the same functions concerning ***Objectinfos, Sync oder Goto***.

4.4.1.5 Submenue Timer Control

Timer Control has the purpose to control a DSLR camera. It's submenus are ***Start***, ***Setting***s and ***Mirror Lockup***



I start at ***Settings***, which contains 3 further submenues ***Edit, Load, Save***.



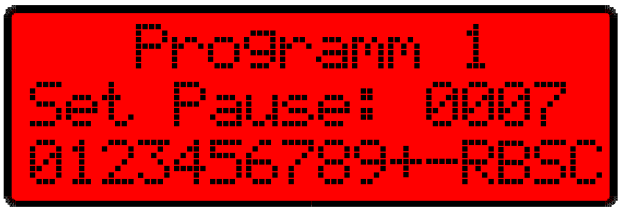
At ***Edit*** you can define 7 programs for exposition times. All settings except ***Repeat*** can be made in seconds. These parameters can be defined. First you can define if there shall be a break between the expositions and how long the break shall be. If you set 0 no break will be generated. Next you can set the exposition time ***(Expose)*** and at last the number of repetitions ***(Repeat).*** After you have defined a parameter you proceed to the next point by ***S*** and ***DEC.*** If a program has been set the use of ***S*** and ***DEC*** lets you take the step to the next exposition program. If there is no input over here ***C*** and ***DEC*** bring you back to the previous menu. By ***R*** you can step one input back, so you need not to pass through all menus if you want to change something.

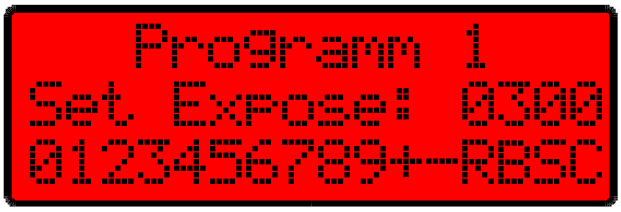
The ***Mirror lockup*** is set in an own submenu. If you make no setting here there will be no mirror lockup. Make sure that this function is deactivated at the camera too, otherwise there is the risk of failure.

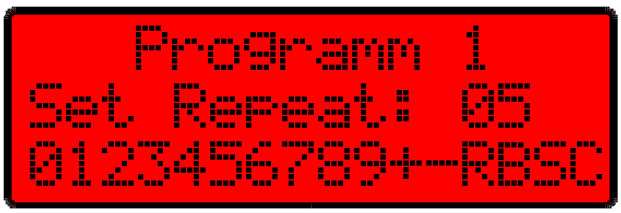
There is one thing special about the ***Mirror lockup.*** There is a little arrow behind the second value set for the mirror lockup. This arrow is to define the camera type. For EOS 300D and EOS 20D the arrow must point upwards, for EOS 350D and supposing EOS 400D there must be an arrow pointing up and one pointing down. First you select the arrow using DEC- or B and then you choose the camera type by + and -. This is necessary because the EOS 350D needs two signals if the mirror lockup is deactivated.

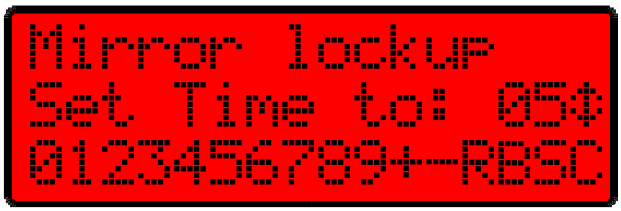
Exposition programs that contain parameters will be performed one by one after choosing the submenu Start.

As an example here is an exposition program with a break of 7 sec, exposition time of 300 sec, and 5 repetitions. The mirror lockup has been set at 5 sec in the menu ***(Mirror lockup).*** The camera setting is for EOS 350D.



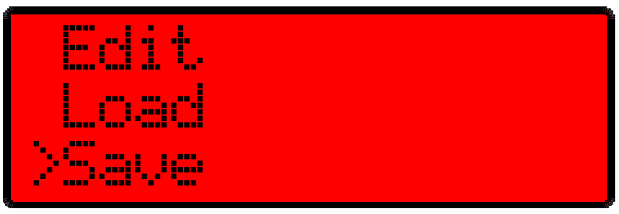


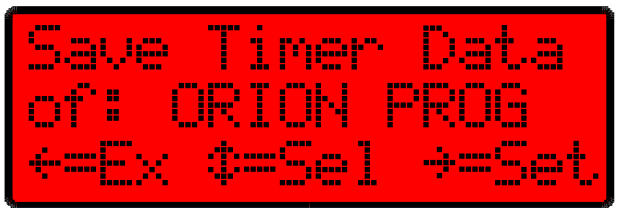




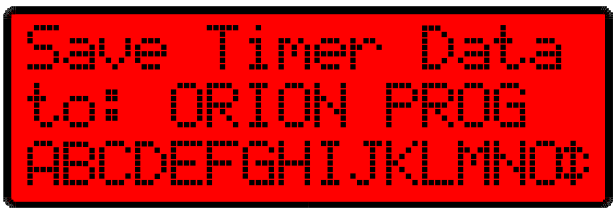
If you want to interrupt a running exposition program do like this: After Start the running exposition program is to be seen on the display but the hand controller box is back to normal modus. By activating the display- modus once again the running exposition program will be stopped.

Now let's talk about the submenu ***Save***. Here you can save up to **10**!! different ***Presets*** that can contain up to ***7 exposition programs*** each.



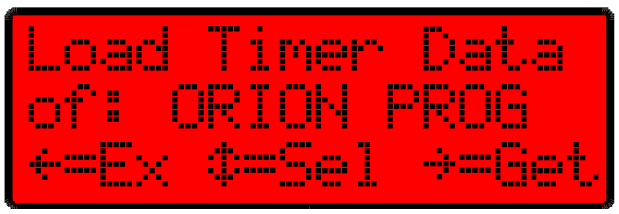


After ***Set*** you can define a name. The use is similar to the settings of the ***Presets*** in the ***User*** menu. This means the arrow on the right hand side gives access to 4 further items.



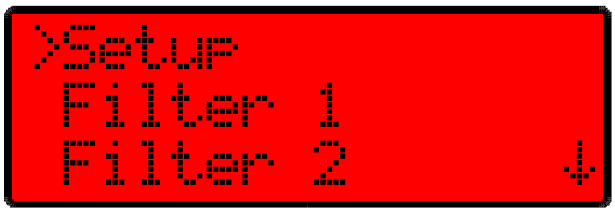
You save the named program of line 1 by ***S.***

By ***Load*** you can load the ***Presets***. By ***Get*** I load the saved ***Preset,*** after Start it will be executed.

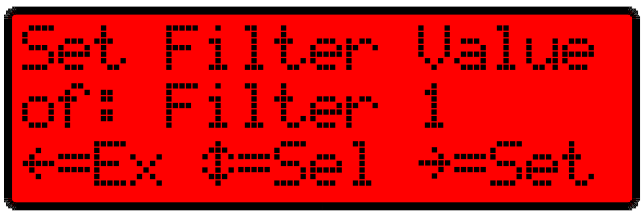


4.4.1.6 Submenu Filters

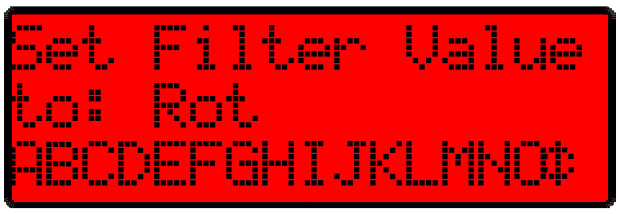
The submenu **Filters** serves to control a motorized filter wheel. **Filters** contains the submenu **Setup** and an extra submenu for each filter of the wheel. The filter that is active now is preselected in the menu. If you did not name the filters yet they will be called **Filter 1. Filter 2, Filter 3** and so on. If there is no filter wheel attached only the **Setup** menu exists.



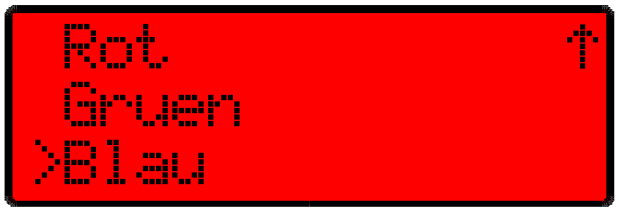
By **Setup** you can name all existing filters. So you have a free choice for the names in the Filter menu and can unambiguously identify each one. If you call Setup a list containing the actual filter names appears.



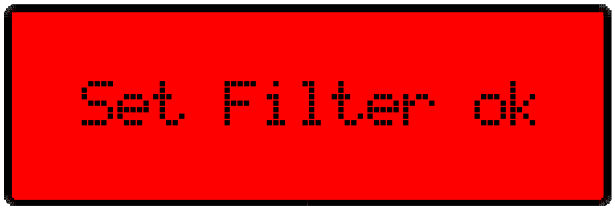
Using the scroll buttons you select the entry you want to edit and confirm by „Set“. The screen switches to the Edit mode and the name can be changed using the Text editor or saved permanently by „S“.



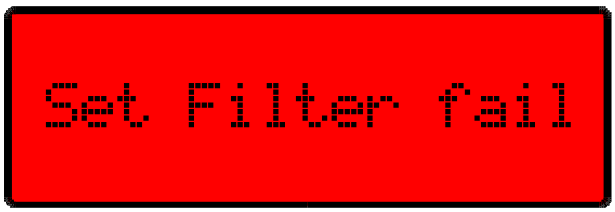
You select a filter of the wheel by choosing the filter’s name in the menu.



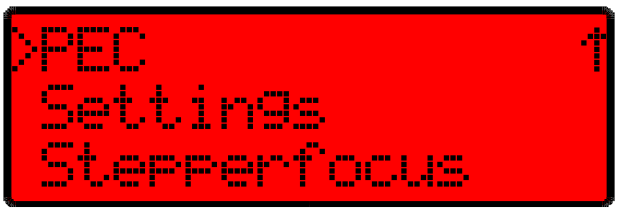
This is the given confirmation.



Or if you fail:



4.4.2 Menu 2: Tracking, PEC, Settings und StepperFocus

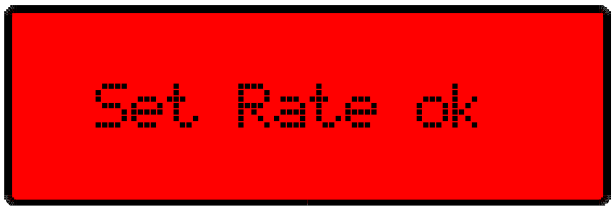


4.4.2.1 Submenu Tracking

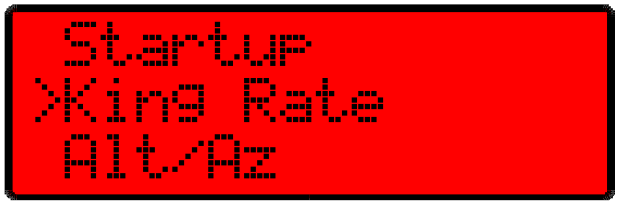
Tracking contains the submenus ***Tracking Rate, Tracking Mode, User Rate,*** and ***Park Mount***.

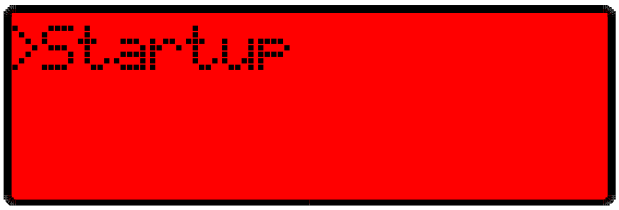
The first ***Tracking Rate*** has 5 different possible settings ***Off, Sidereal, Solar, Lunar*** and **User Rate.**

By ***Select*** you choose the ***Tracking Rate*** and confirm by ***Set***. If you choose **User Rate** the speed is set as you configured it in User Rate.

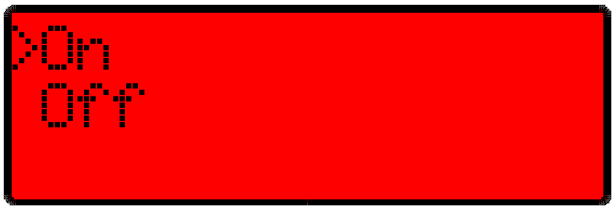


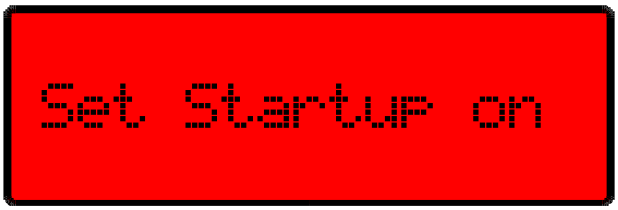
Next is ***Tracking Mode*** which offers some complex options. It contains the submenus **StatUp, King Rate**, and **Alt/Az** that can individually be switched on or off at the controller's power up.





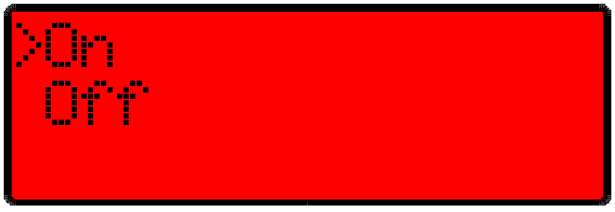
The mount will start with the tracking speed set under ***Tracking Rate*** at the power up of the controller.

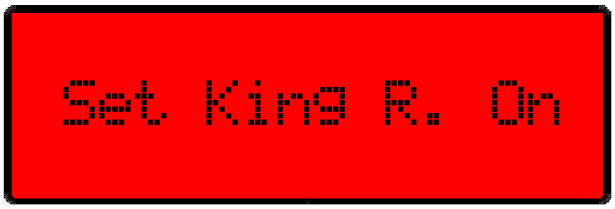


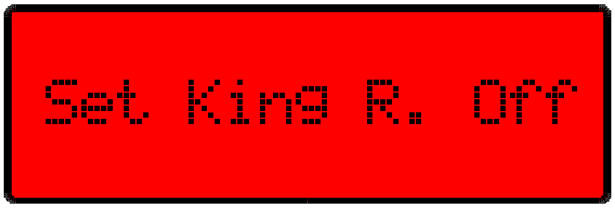


So the mount will start to move at the power up of the controller running at the tracking speed you selected as **Tracking Rate**. If you selected “off” at **SetUp** the mount will not move at the power up. The mount will only start tracking after you pressed a button for direction or after it got a LX200 order from the PC.

Kings Rate offers the option to compensate the atmosphere’s refraction when tracking.

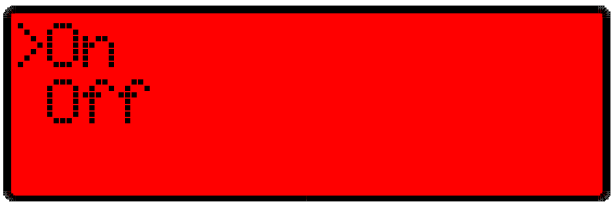


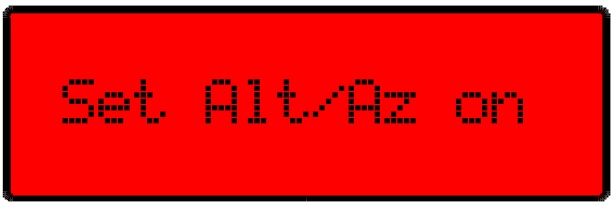




RA tracking is not sufficient for some mounts, Dobson's for instance, as you must track at changing and different speeds on both axis. Sure you can use the options Goto, Sky Agent and all the others in the **Alt/Az** mode too. To use the Alt/Az mode it is essential that the input of time and local coordinates is correct. As soon as the controller knows where it is looking and where it is standing the tracking will be done on both axis. Tracking speed is not constant and depending on where you are looking. Let me make one remark. If objects move at changing speed there might be a little error as the Alt/Az mode works on average speed. If you want the tracking to be more precise you may use the new option **User Rate** to configured the change.

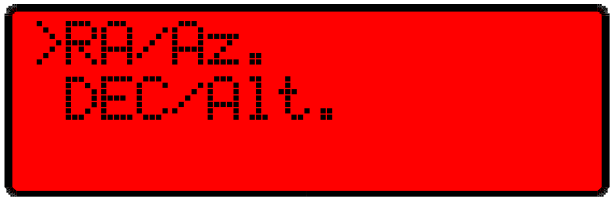
To start Alt/Az tracking you must activate **Alt/Az** in the next menu. If you change to Alt/Az mode or back to RA/DEC mode the control must be started again, this should happen automatically if you succeed. Here you can see the mode activated and the confirmation.

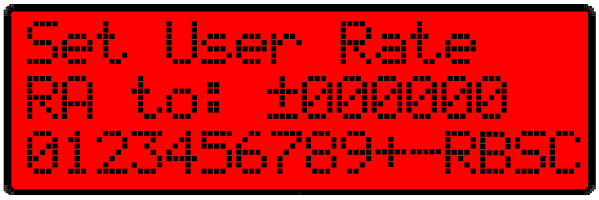




The next menu **User Rate** does what the name tells you. It is used for the input of a user defined **Tracking Rate**. The defined speed difference will be activated using **Tracking Rate,** only the configuration is done over here.

Sure you can set the value for both axis. Now I only show the setting for the RA axis.





The value configured shows the speed difference to sidereal speed. It is set in seconds per day, so this means time-seconds for RA and arc-seconds for DEC. The + or - tells if the speed is higher or lower than the sidereal rate. Here is an example using a comet.

You know a comet's coordinates at to dates 10 days apart.

Date	RA	DEC
2010.02.13	08h22m15s	7°30'10"
2010.02.23	08h43m25s	5°29'00"

First you calculate the proper motion within those 10 days.

08h43m25s - 08h22m15s = + 21m10s = + 1270s

+ 5°29'00" - +7°30'10" = - 2°1'10" = - 7270"

To get the value per day the figures are divided by 10.

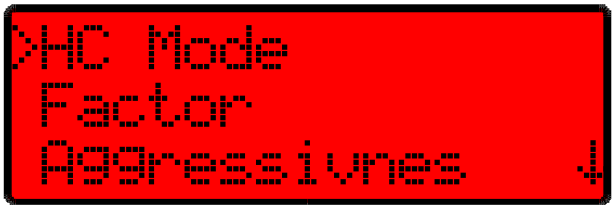
+ 1270s / 10 = 127s, -7270" / 10 = -727"

These values are now set at User Rate for RA and DEC.

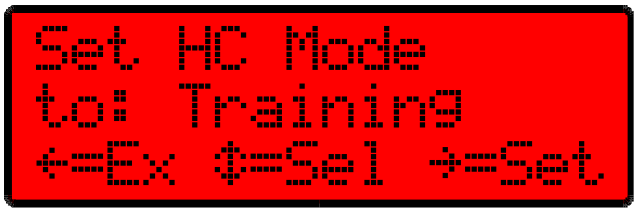
At last ***Park Mount*** stops the motors, saves the actual PEC data and prepares the control for **Auto Alignment**. When you next start the controller **Auto Alignment** will automatically make a Sync to the coordinates used last. You can immediately start a Goto to the next object. The common Sync to a known object is no longer necessary.

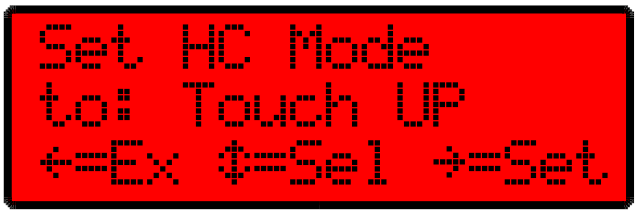
4.4.2.2 Submenu PEC

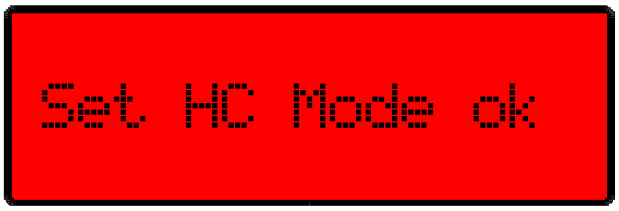
The submenu PEC contains 4 items ***HC Mode, Factor, Aggressivnes*** and ***PEC Tracker***



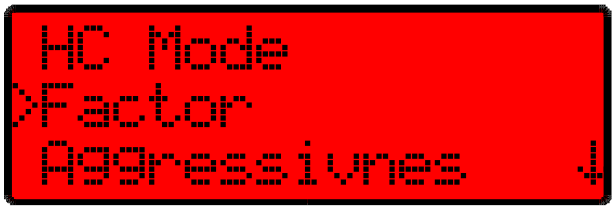
In the menu ***HC Mode*** you can define if you want to start a ***PEC Training*** or a ***Touch Up*** using menu 3 of the hand controller box. If you choose Training a new PEC table will be created and substitute the table that has been saved in the controller. If you want to keep the old table you have to save it before. If you choose Touch Up the existing table will be maintained, you can optimize it and work on it. This is less effort than a complete new training.

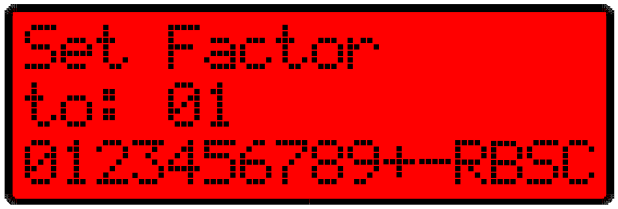




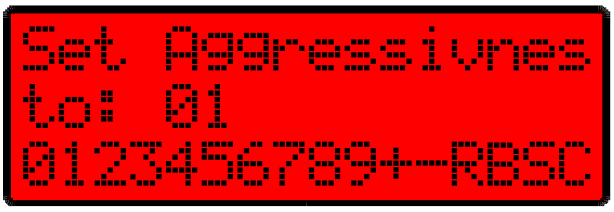


Factor serves to set the maximum correcting difference of the PEC corrections. This value is found by try and error.





Aggressiveness tells how fast the PEC corrections will be executed. This is to be found out by try and error too.



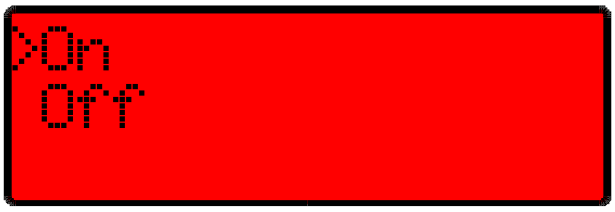
Now let's attack the next point the ***PEC Tracker.*** We let the master himself tell what this new function is all about.

PEC-Tracker is the name of the Encoder-supported PEC (EPEC) of the LittleFoot Elegance Photo. The PEC-Tracker leads to the same results as other encoder-supported PEC systems. Because it works in a completely different way the problems that are to be found in time based systems are avoided.

The big problem of systems as the PEC-Watcher (Telescope Drive Master) is that it depends on time and that there is no feedback from the step motor controller. Every correction even the smallest one made by the controller will be misunderstood as an error. To reduce these „errors“ the mounting must be polar-aligned very carefully. Frankly spoken the PEC-Watcher does not even know the PE, the IMHO just compares the time gone by to Encoder position. This system without possibility for corrections has been found useless as IMHO. That's why we await the V2, let's wait and see how they want to solve the problem.

The PEC-Tracker does the job in a completely different way. It is part of the step motor controller, it knows the mechanics and all parameters that are to be found in the controller. So it does not misunderstand corrections as errors either because it knows their origin! The PEC-Tracker does not compare any time values either, it knows the real positions and does not try to figure them out using time values. The PEC-Tracker makes use of the Encoder to synchronize tracking and controller. So there is an internal synchronization of actual and desired position , no time value is needed. The advantage over time based systems: the PEC-Tracker and the step motor control are one unit. Corrections no matter if done by ST-4, LX200 or the HB do not disturb the system. There are no problems caused by overlapping are control dictionary correction commands. All interfaces remain free and can be used otherwise. No extra power supply is needed. There is not any further device needing wirering. Last but not least: the PEC-Tracker does not cost another 1000 Euro.

So far the explanation given by Rajiva.

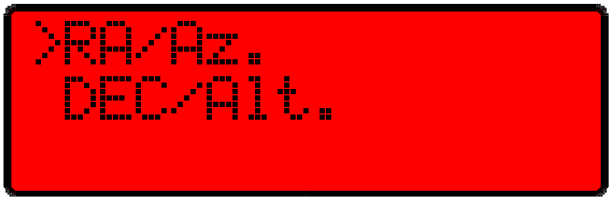


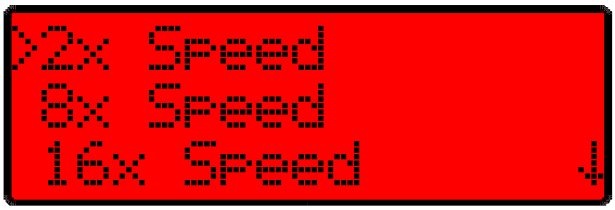
The ***PEC Tracker*** just gives the option to be turned on or off. Anything else is done automatically.

4.4.2.3 Submenu Settings

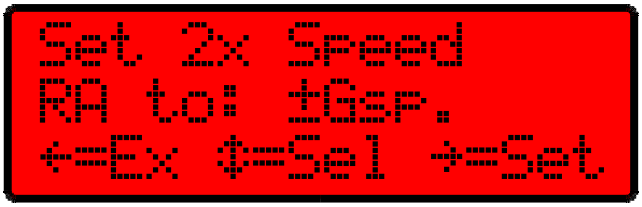
In this menu you can modify ***Speed***, ***Backlash RA*** and ***Backlash DEC*** as well as ***Ramp*** and save by ***Save Preset*** . There are also the items ***RTC Settings*** and ***Encoder.***

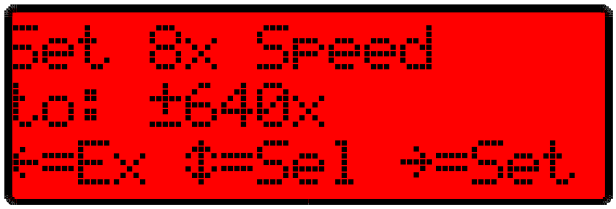
Let's start with ***Speed.*** The menu ***Speed*** offers the settings ***2x***, ***8x***, ***16x***, ***Goto Speed***, ***Backlash Speed, and Guide Speed.*** All values can also be set for one axis independently.



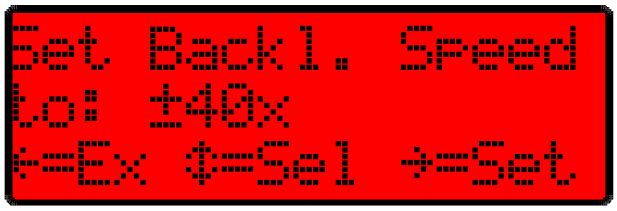


The submenus **2X Speed,8x *Speed, 16x Speed*** and ***Goto Speed*** offer values from ***4x*** up to ***640x***. As well there is an option **Gsp** to select the Guiding speed as it will be explained at **Guiding Speed. Sure** that the maximum possible speed depends on the motors and gears, so there is no guaranty for this max. speed.

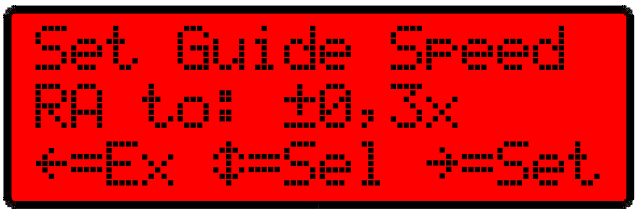




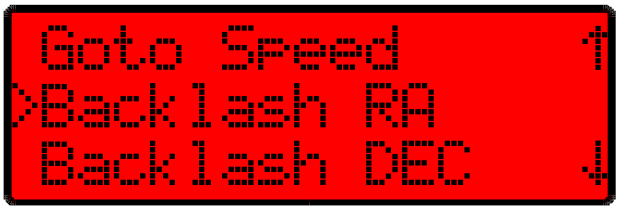
The menu ***Backlash Speed*** leaves space to set a backlash speed different from the preset Tracking Rate. This makes sense if there is a big backlash in the gear. Possible values are ***4x*** up to ***40x.***

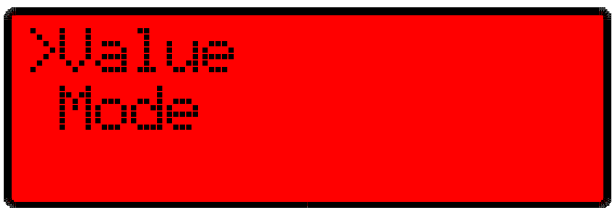


The submenu **Guide Speed** is used to choose the value for correction movements when auto guiding. Possible values are **0.3X, 0.7X and 1X** star speed.

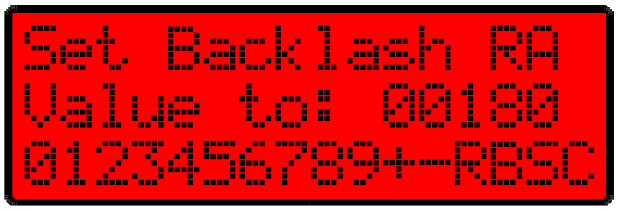


The menu subjects ***Backlash RA*** and ***Backlash DEC*** each contain two submenus ***Value*** and ***Mode.*** I just present the ***Backlash RA*** menu because ***Backlash DEC*** is exactly alike.

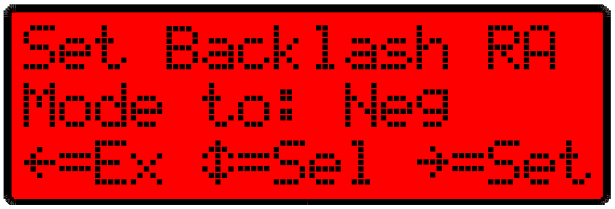




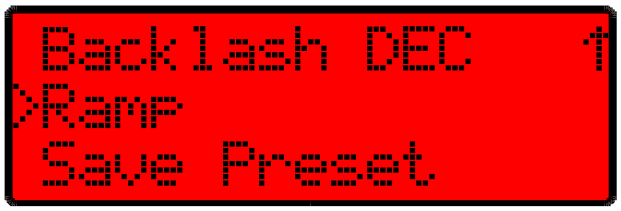
In the ***Value*** menu the ***Backlash*** value is set. ***Backlash*** means the clearance of the gear that you notice when you reverse the ***Tracking*** direction. You can set a value to compensate the gear's backlash. This value must be found out by try and error.

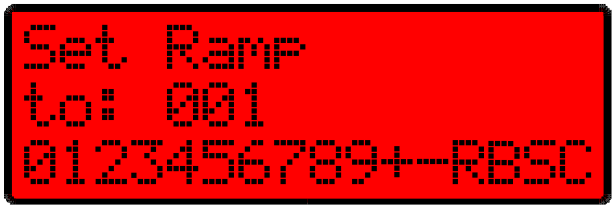


The ***Mode*** menu lets you set the direction of the backlash compensation. Possible settings are ***Positv , Negativ or none.***

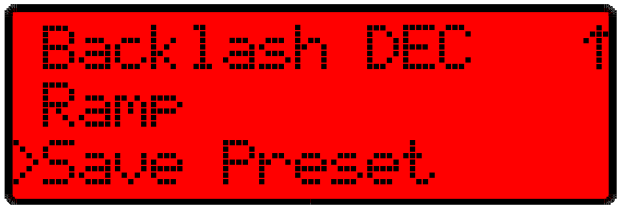


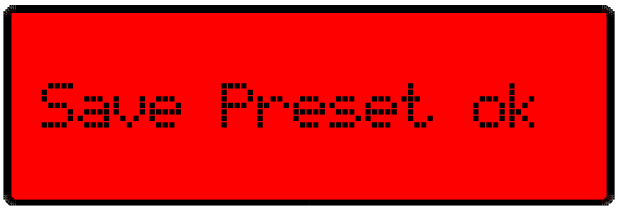
The ***Ramp*** menu gives the option to define a ramp for acceleration and slow down of the motors. This enables a smoother motor run and sometimes the final speed for certain combinations of motor and gear. The value has to be found out by try and error too. If you notice problems when starting the motor at higher speeds have a first try with value 50 and then approach to the optimum.



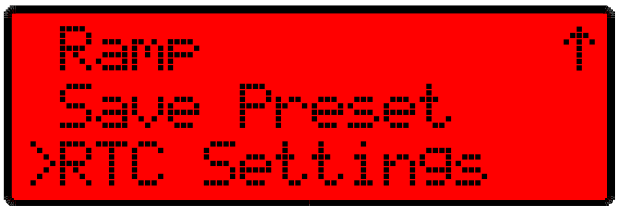


The ***Save Preset*** menu serves to save the settings made in the ***Settings*** menu.

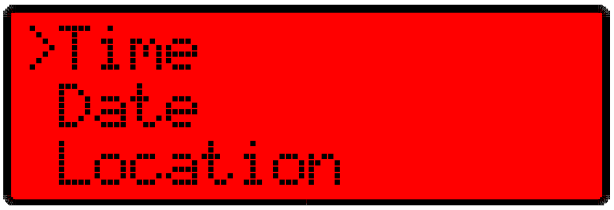


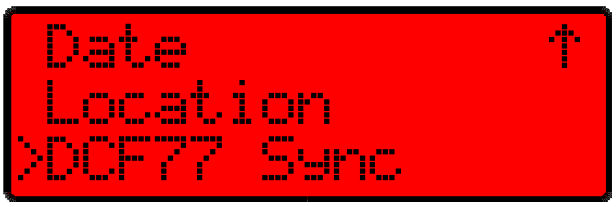


Next in the menu ***Settings*** is the setting for the ***Realtime Clock (RTC).***



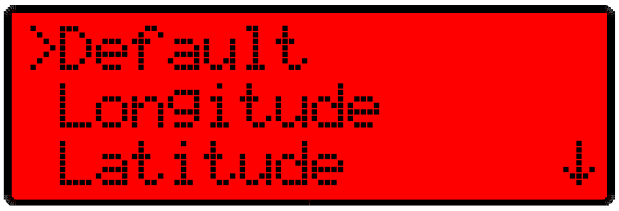
Settings are possible for ***Time, Date, Location,*** and ***DCF77 Sync.***

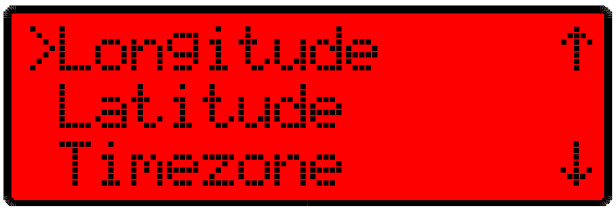


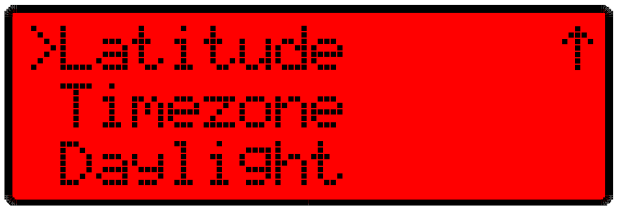


Time and date are always given in local time for the chosen location. The are internally translated to UTC. Because the Realtime clock uses UTC data you must define the location first and set the time afterwards. If you choose another location time and date will be translated automatically. There is no need to set the clock again to change the time zone or change from standard to daylight saving time. The setting for a new location is sufficient. For this reason I take the last menu point as a start.

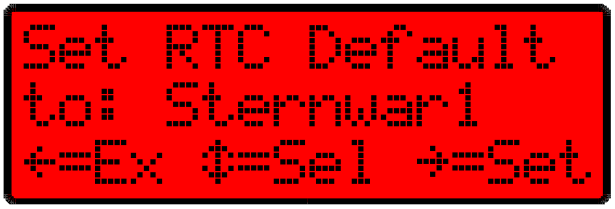
Next to last in the ***RTC Settings*** is the subject ***Location.*** You can save up to three locations. The menu ***Location*** contains the submenus ***Default, Longitude, Latitude, Timezone*** and ***Daylight .***



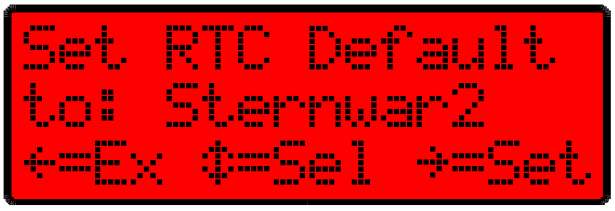




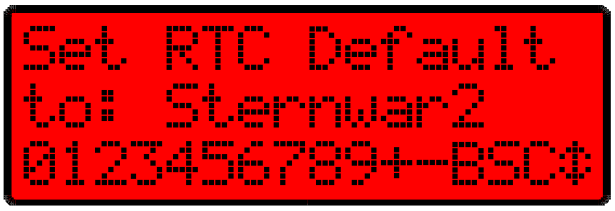
In ***Default*** you can define and select the locations. The input of coordinates in the following menus is always related to the location indicated in ***Default***.



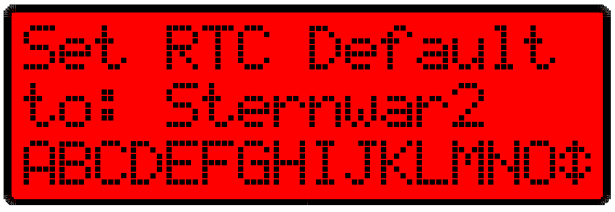
Use ***Sel*** to switch from one location to another.



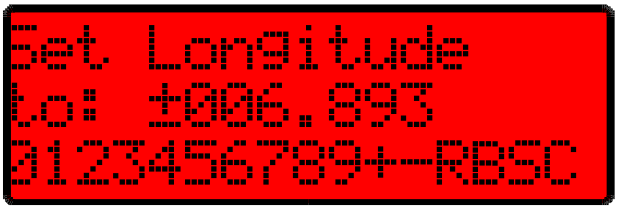
By ***Set*** you open the menu for setting and saving.



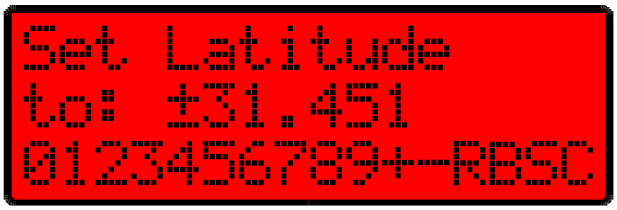
As you can see there is the option for input of letters if you click on the arrow on the right. Here you have access to four further lines for input. There is space for up to 9 signs. To save the locations' names use ***S.***



Next there is the menu ***Longitude***. Make sure that the sign (+,-) is correct. East of the Greenwich meridian is +, west of it is -.



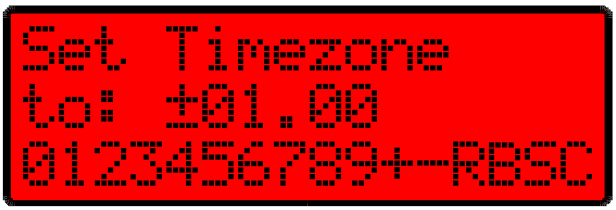
Now we go for ***Latitude.*** There is a sign also which is + for northern and – for southern latitude. Just to mention it once again, the setting is for the location selected in ***Default*** only.



The procedure is as follows. First you select a new location using ***Default*** then you make the input of it's coordinates.

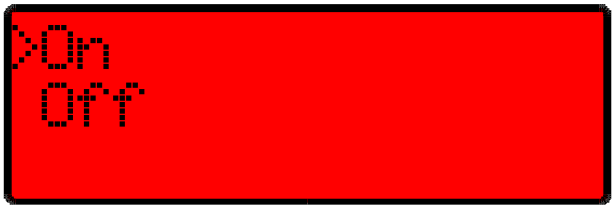
Users that own a GPS extension have no need for input of date, time, and coordinates. These can be easily transferred using the menu ***GPS Data.*** In this case you just must define the locations and relate them to a time zone.

This leads us to the next menu ***Timezone***

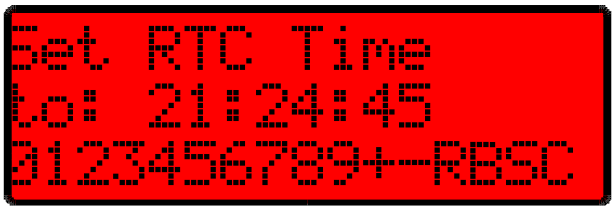


Here you tell the time zone for the „chosen location“. Locations east of Greenwich get a +, west of it they get a – sign.

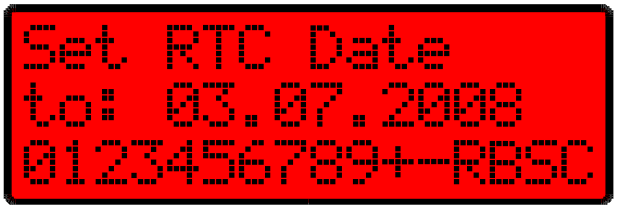
Next in the menu there is Daylight. This gives the option to set daylight saving time „on“ or standard time „off“.



Next let's have a look at ***Time***. This is the menu for the input. Keep in mind that the clock is not running as long as you are working in the menu. As soon as you leave the actual time will be shown once again.

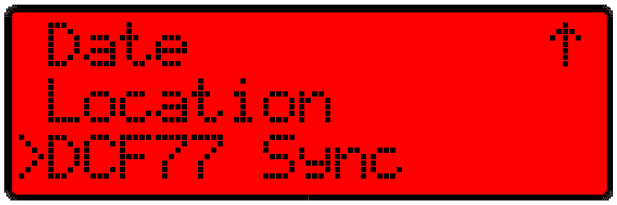


Next the menu *Date* is to put in the actual date.

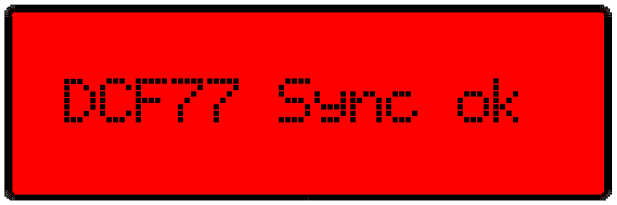


Last menu is **DCF 77 Sync**. The time signal broadcasting station in Maifingen uses long wave to transmit exact time to most radio controlled clocks in western Europe. DCF 77 is the call signal given to the station for international identification. Link to Wikipedia.

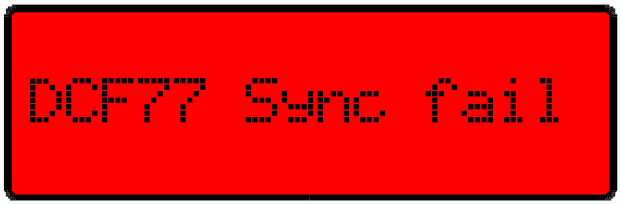
The receiver is connected to a Tiny Interface (regard list of links) to supply the Little Foot Elegance Photo with the time signal.



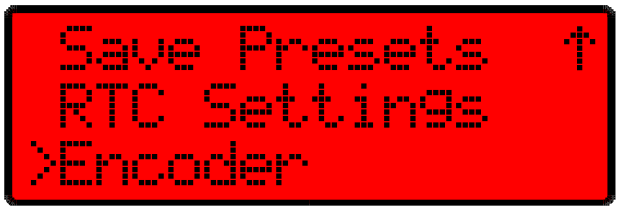
If the hardware is connected the call is confirmed by the screen below. At the same time the data for time, day, time zone, light saving - or winter time are saved.



If no Tiny DCF 77 module could be found the failure is shown.

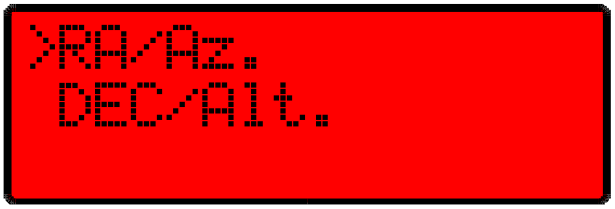


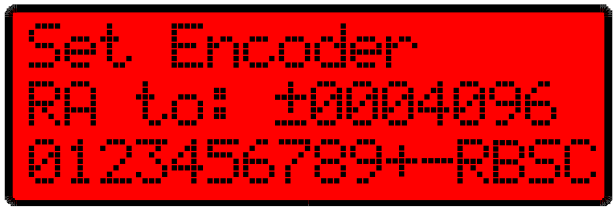
The last point of the *Settings* menu is the Encoder-Setup.



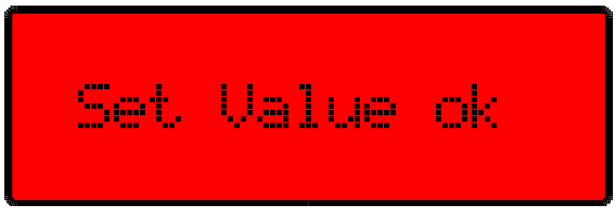
I'd like to point out once again that the Encoder socket of the Elegance Photo is compatible to the pins of "Sky-Commander", "NGC Max" and "NGC MiniMax". You must not configure an existing quadrature. Tell the real resolution.

The resolution of the optical encoders is told per axis.





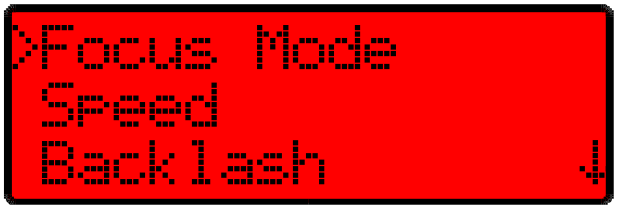
Here it is 4096 ticks per revolution. Using “+” or ”-” you can define the size of revolution as you did at Axis Dir when you did the Mount Setup. The setting for the DEC axis is done alike. This is the confirmation message.

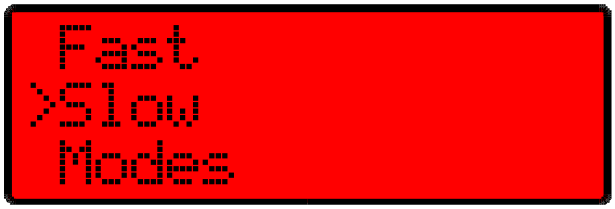


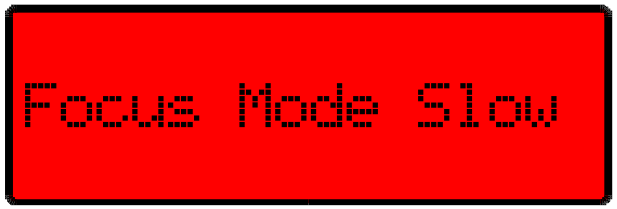
To make the changes work you need a Reset of the controller using Menu 3 Controller!

4.4.2.4 Submenu Stepperfocus

The submenu ***Focus Mode*** gives the option to choose how and how fast focusing is done.

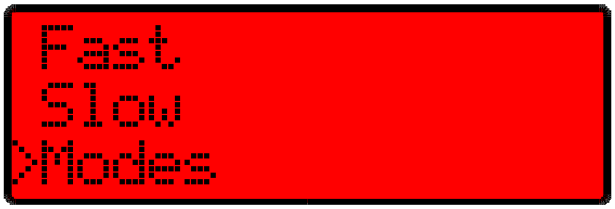




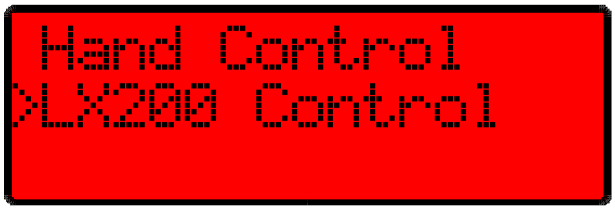


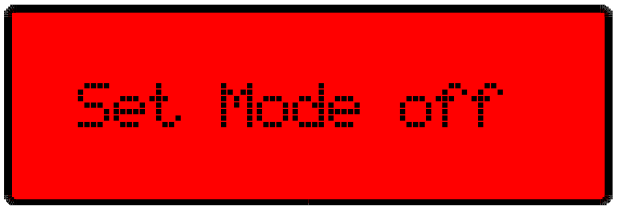
Here the slow speed was selected. The focus motor is run by hand controller box menu 1.

Next subject of the ***Focus Mode*** menu is ***Modes.***



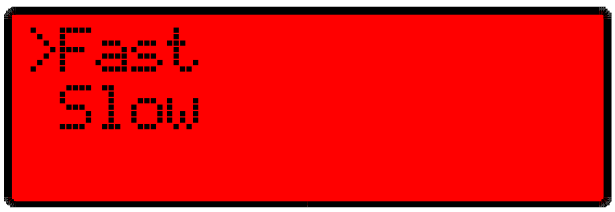
You can decide whether you want to use the hand controller or LX200 commands to control the Stepperfocus.

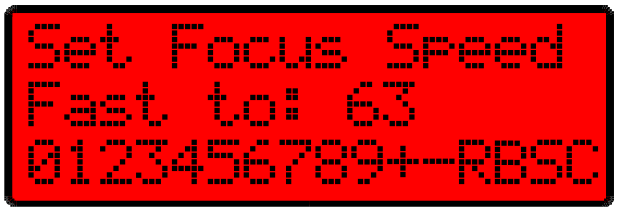




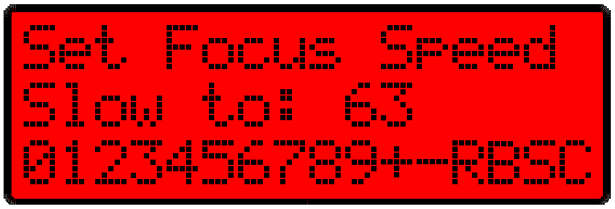
Each function can be switched on or off.

The next subject is ***Speed***. Here you can choose the speed for the Focus mode options of the ***Focus Mode*** menu.

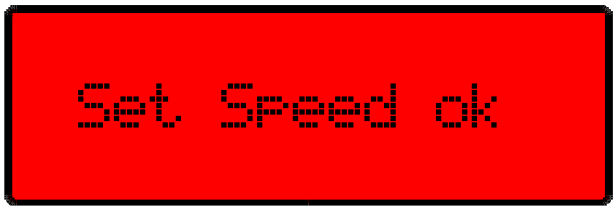




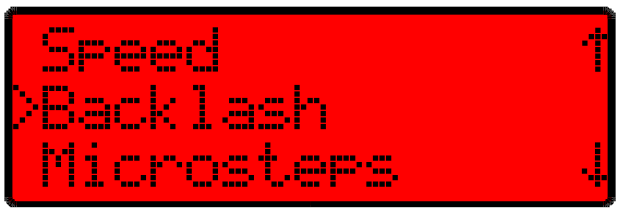
Possible values are 0 up to 63. As the hardware consists of different combinations of motor and gear you have to find out the optimum speed yourself.



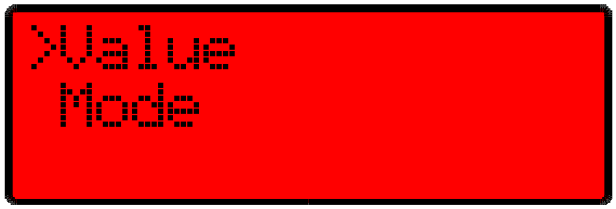
Here the setting is for Slow. Possible values are 0 to 63. After saving the value you get this confirmation.



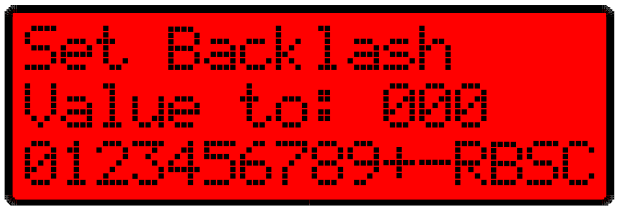
The next subject ***Backlash*** gives the option to compensate the backlash of the Stepperfocus.

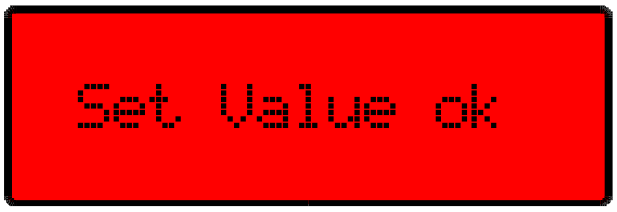


It contains two submenus ***Value*** and ***Mode***

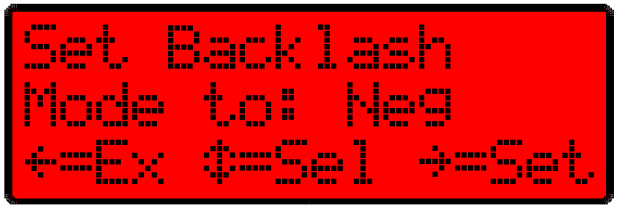


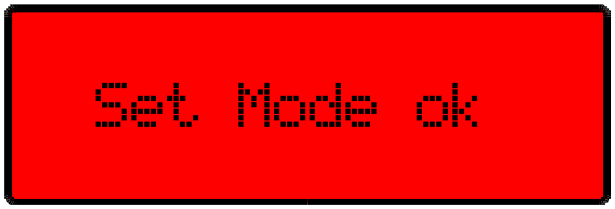
Use the ***Value*** menu to set the ***Backlash*** value. ***Backlash*** means the clearance of the gear that you notice when you reverse the focusing direction. The value for the compensation must be found out by try and error.



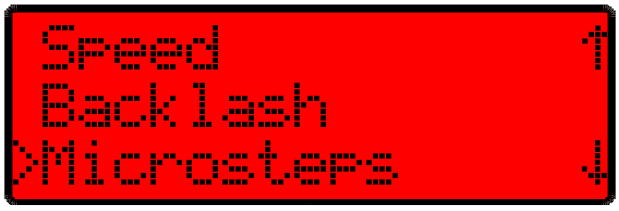


The ***Mode*** menu gives the option to set the direction of the backlash compensation. Possible settings are ***Positv , Negativ or none.***



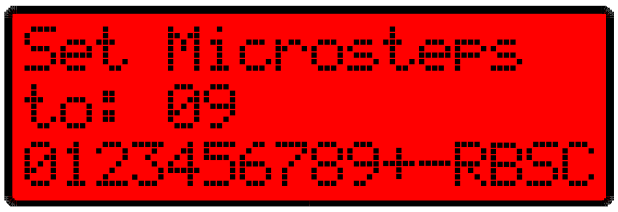


Now let's talk about ***Microsteps***

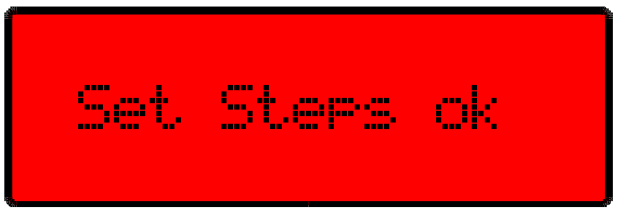


This tells the number of microsteps per Robofocus-step. So you define how many microsteps will be executed by the motor if the Robofocus gives command for one step. Sure that a higher value

increases the focusing speed but this is only half the truth. The Robofocus protocol also defines how much time it takes to make the step. During this time the microsteps must have been accomplished too. Generally spoken a smaller number for the microsteps gives a better steadiness of the focus motor .A bigger number increases speed but also reduces the steadiness of the motor. **Each and everyone should find out an optimum value for his Setup.**

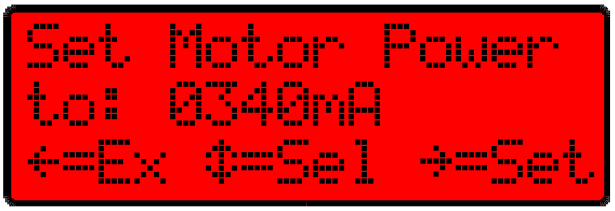


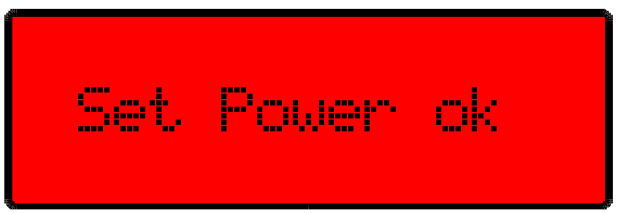
Possible setting is up to 64 microsteps per Robofocus step.



This is what the confirmation looks like.

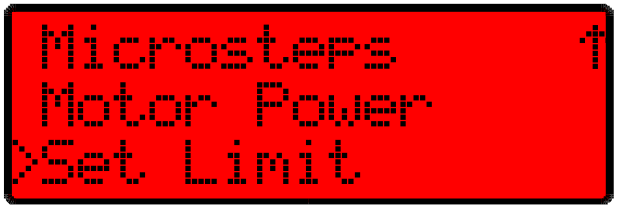
The next subject ***Motor Power*** gives the option to adjust the current of the ***Focuser Motor*** in defined steps. **Be careful with this configuration, these are big steps.**

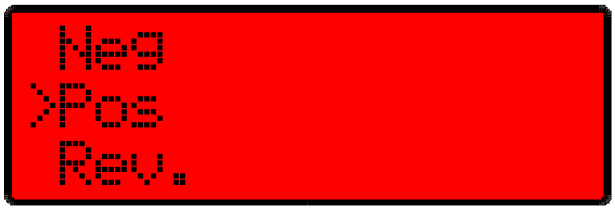




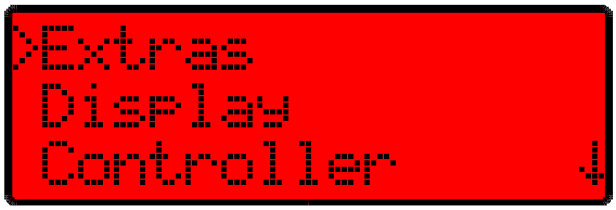
This is the confirmation for setting the Motor Power.

The next subject ***Set Limit*** works on the focuser's range. The motor must stop a little bit ahead of the drawtube's limit. To achieve this you approach the motor to a position and save this position as ***Neg*** or **Pos.** Rev reverses the setting for Neg and Pos and the motor's revolution direction.





4.4.3 Menu 3 Extras, Display und Controller

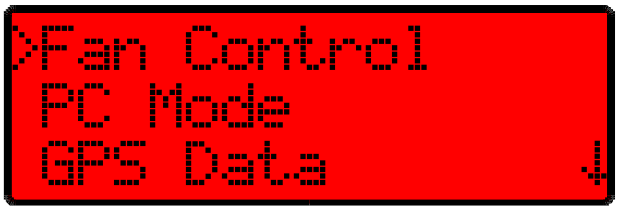


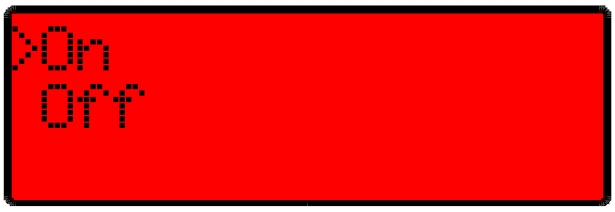
4.4.3.1 Submenu Extras

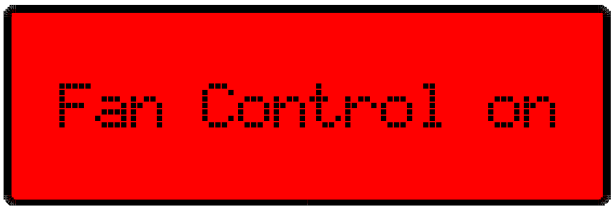
The menu Extras contains the submenus ***Fan Control, Dew Heating,PC Mode, GPS Data , Ethernet, and Ext Port.***

Submenu Fan Control

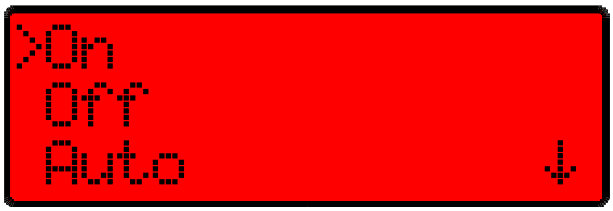
The submenu ***Fan Control*** is used to control a telescope-fan. The fan can be switched on or off.



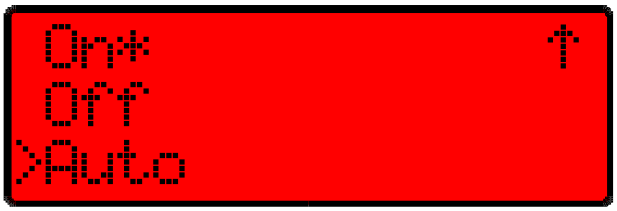




The **Dew Heating** submenu serves to control an external heating for the secondary mirror or the camera. You need an extra hardware (regard linklist). If you call the menu the up to date status is shown and can be changed by On, Off or Auto.

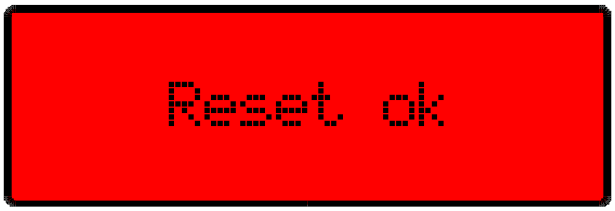


If there is a starlet with On or Off this shows that the status had been chosen automatically. The automat uses the computed data of the dew point to switch the heating on or off automatically.



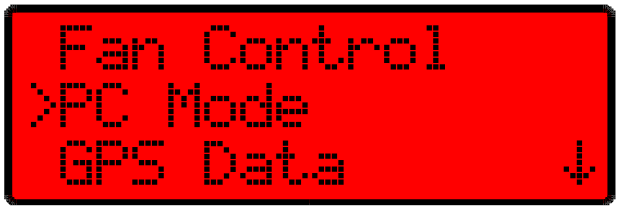
This is the confirmation for choosing an option.

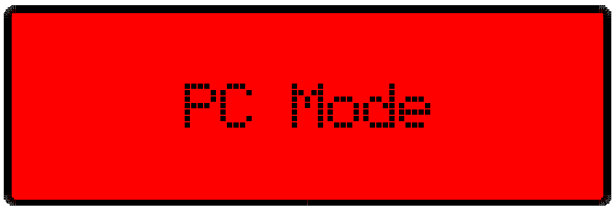
By using **Reset** in the menu you can start the external hardware once again.



If there is no such external hardware „failure“ will be shown.

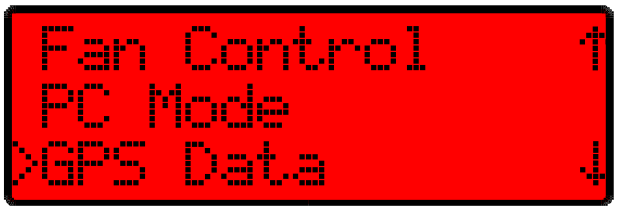
The purpose of ***PC Mode*** is the transfer of data, ***Tourdata*** for example, from the PC to the display. Find details about this in the instructions for the „Goto Tour Editor“. Just activate the mode after start of the „Goto Tour Editor“.



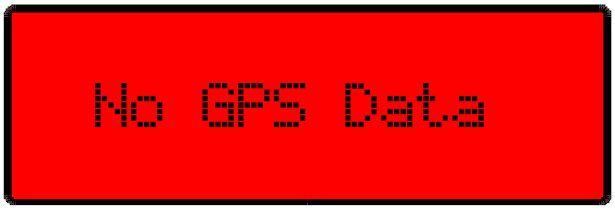


After the data have been transferred and the „Goto Tour Editor“ is closed there will be a Reinit of the display.

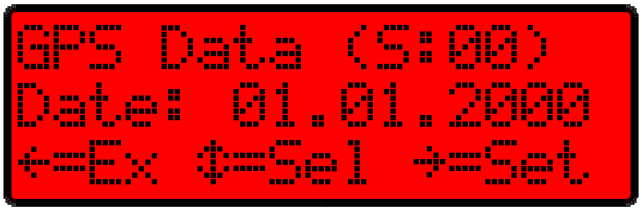
Next there is ***GPS Data.***



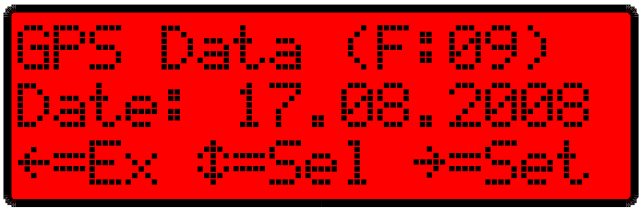
If no GPS Mouse is connected you see this message after start.



After the GPS Mouse has been connected (watch the link list at the manual's end) the GPS time signal well be received. Keep in mind that the receiver is an old model that needs free vision in different directions. After click on the menue subject you get this confirmation.

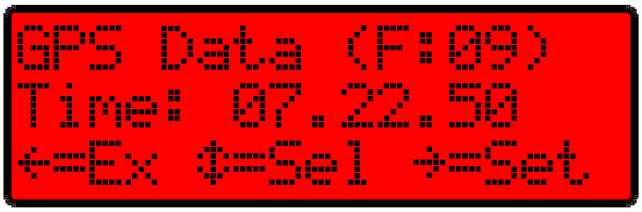


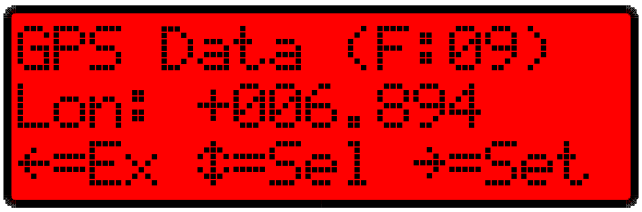
Soon the display will look different, like this for example.

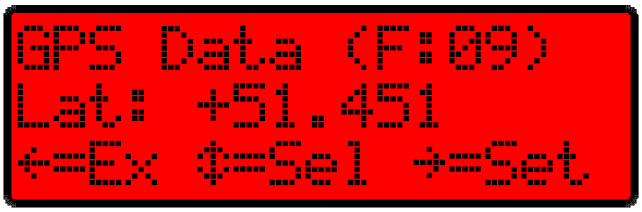


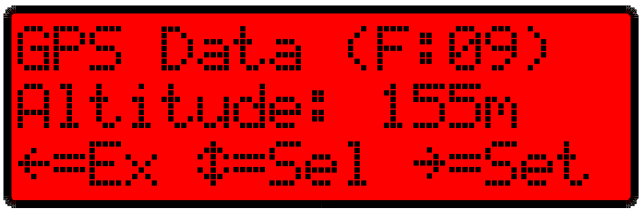
Here you can see that now 9 satellites have been found. The date is up to time too. ***Set*** will transfer the date to the RTC. Using ***Sel*** you can switch from one of these displays to another.

Keep in mind that the GPS time signal is transmitted in UTC.

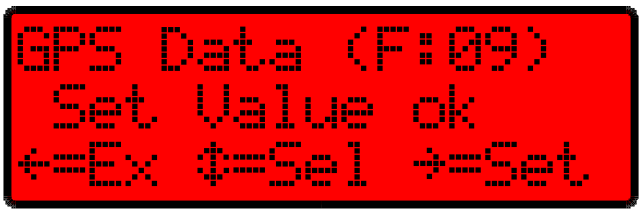






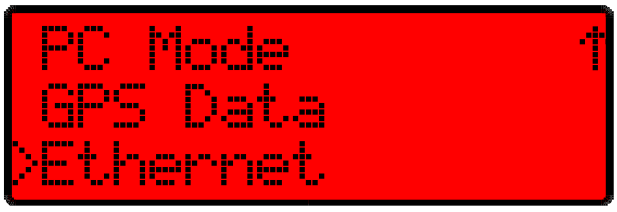


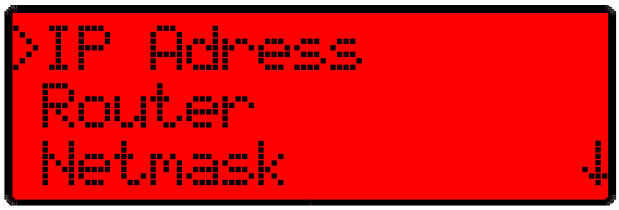
Set will transfer the indicated value for the location you choose in the ***RTC menu.*** Confirmation is like this.

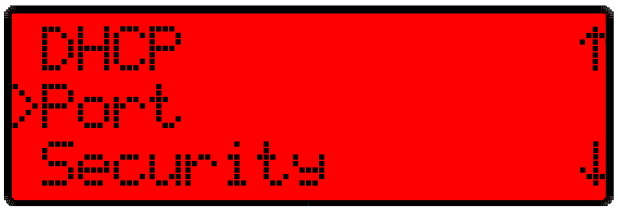


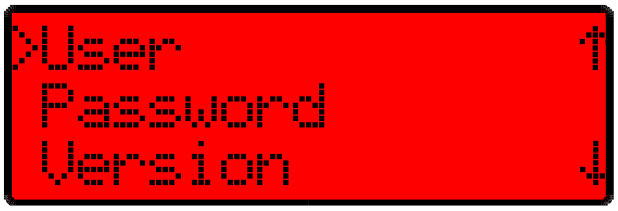
The last subject of the Extras menu is the ***Ethernet.*** Here many settings for the inserted Ethernet interface can be made. You can configure ***IP Adresse, Router*** and ***Netmask***. You can also make use of the even more comfortable option to have everything transferred automatically by a ***DHCP*** Host. The ***Port*** can be configured too. We took care of the safety too. You can set the ***User*** and ***Passwords.*** These will be checked for any access. Another important feature is the permission of firmware updates for the Ethernet interface at ***Updates.*** Only after your permission for an update a new firmware for the network interface can be transmitted. In the end you get a confirmation for the actual firmware ***version*** and a ***Reset*** function to transfer the settings to the Ethernet controller.

Here you can see the menu points at a glance:



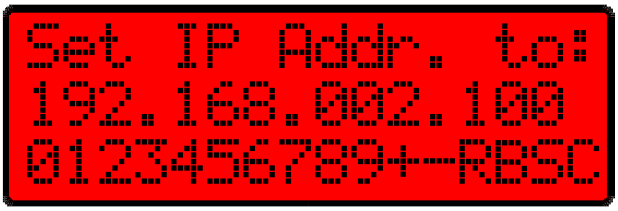




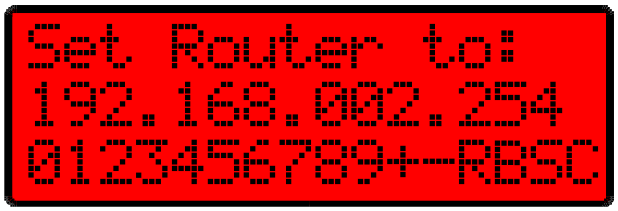


Now let's look at the functions one by one:

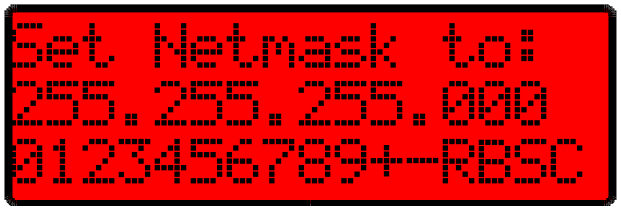
I shall start at the input of the ***IP Adresse***. Make sure that the address fits into the existing Adress-Range network. Otherwise no connection can be established. This is what the display looks like:



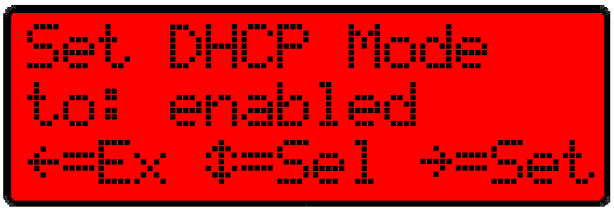
The next step is to tell the address of the ***Router.*** Mine has this address. The address can be different depending on the instrument and the company. If there is any doubt have a look in the router's manual.



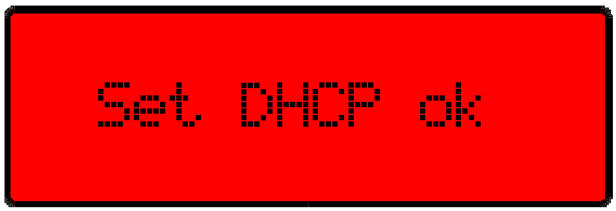
Next is the input of the ***Netmask***. Every IP-address is split into a network part and a host-part by a netmask. The netmask tells at which Bit the IP-address must be divided. The bits masked by the netmask are the same for all hosts of one network. A host needs the information whether an instrument is part of the same network (which means the same part of the network in the ***IP-address)*** to take routing decisions.



If all this input is to much for you, you can facilitate the things if your router has a ***DHCP*** Host. The menu ***DHCP*** gives you the option to configure the settings automatically. Set the function „enabled“ in the DHCP menu.



After click on Set you get this confirmation.



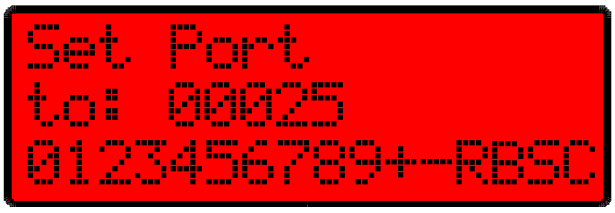
The next menu is ***Port***. Here is a brief explanation from Wikipedia:

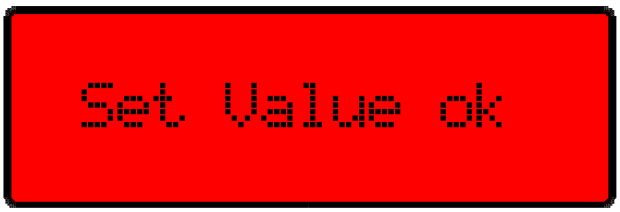
A **Port** is part of an address, that connects data segments to a web protocol. This concept is for example intended in TCP, UDP and SCTP to address protocols in the higher levels of the OSI-model. In these three protocols the port number's size is 16 Bit, values 0 up to 65535 are possible. Some applications use port numbers given to them by IANA and generally known. They are 0 to 1023 in general and called *Well Known Ports*. 1024 to 49151 are the so called *Registered Ports*. Producers can have ports registered for their proper protocols, much like domain names. Registration gives the advantage that an application can be identified by it's port number, this is only possible if the application makes use of the port registered at IANA. The ports with port numbers 49152 to 65535 are so called *Dynamic* and/or *Private Ports*. They can be used in many ways as they have no registration and connection to an application.

Computers that exchange data use the port to separate data streams one from another. A port bar disables or slows down a certain port respectively the service trying to get access. Some Internet Service Providers use the blocking of ports to block hostile users. Some providers do not like users that need much capacity like those File Sharing for example. Ports can also be blocked by a Firewall. Local firewalls normally do it the other way round. Only the ports needed get access, all others are blocked. This makes attacks against the protected web or the PC less likely.

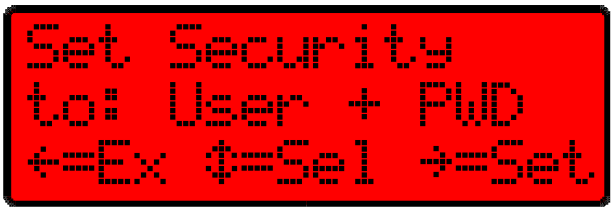
Seite „Port (Protokoll)“. In: Wikipedia, Die freie Enzyklopädie. Bearbeitungsstand: 2. April 2009, 20:11 UTC. URL: http://de.wikipedia.org/w/index.php?title=Port_(Protokoll)&oldid=58615969 (Abgerufen: 31. Mai 2009, 09:28 UTC)

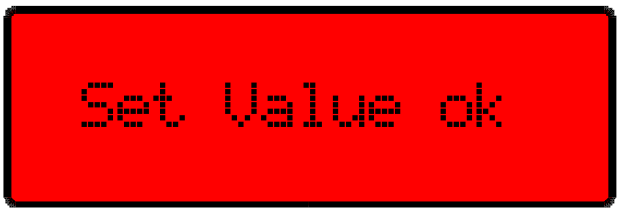
This is the theory. The Elegance can configure ports from 00001 up to 65535. Keep in mind that the application must know the port so that it can communicate with the controller. Default is the port attached to the standard port for Telnet. Underneath you see the confirmation that the port has been saved.



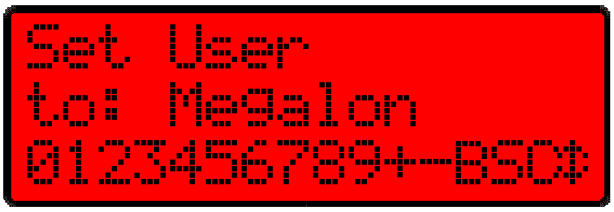


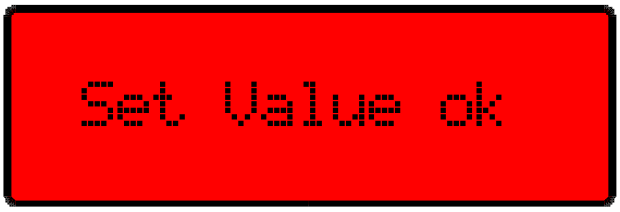
The next subject is ***Security***. You can define if there will be any and how much security measures limiting the access to the controller. Possible settings are Off, User, User + Password (in the menu as User + PWD). This is the confirmation.



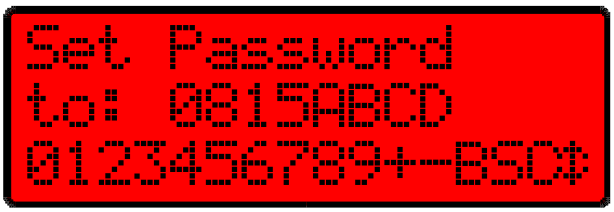


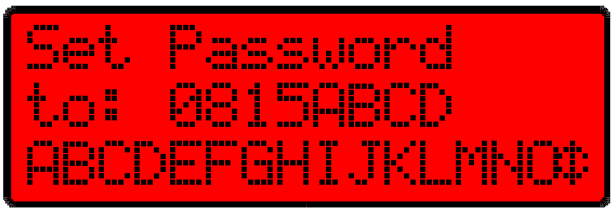
User gives the option to enter names or words up to 11 signs that will be checked by the security at access. The arrow on the right gives access to more displays full of letters, numbers and so on. Underneath you see the confirmation.

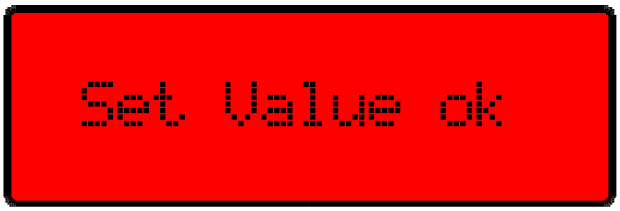




Alike the procedure for the menu ***Password***

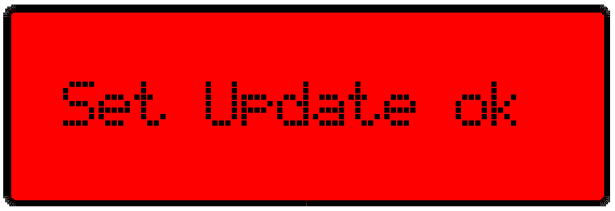




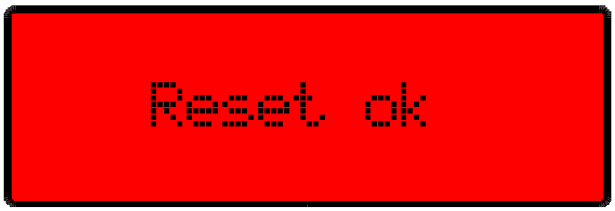


Next the display shows the installed Firmware ***Version*** for the Ethernet interface.

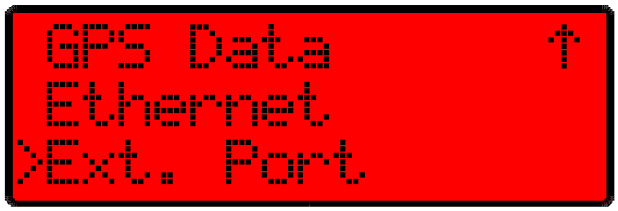
The next item ***Update*** opens the interface for an update of the firmware. This means that you can flash a new firmware using the serial interface after a reset of the controller. Without this authorization that is not possible. You get this confirmation.



Last there is ***Reset***. It starts the reset of the Ethernet-Controller. This is necessary because new settings will only be saved at a reset of the controller.



The last subject of the Extra menu is **Ext. Port**. It concerns the LF extension terminal at the back side of the LFE Photo controller.



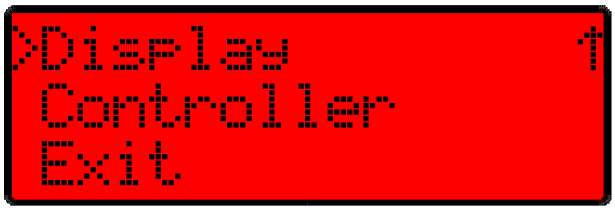
Over there 3 further subjects are to be found.

CAN Bus is still out of order.

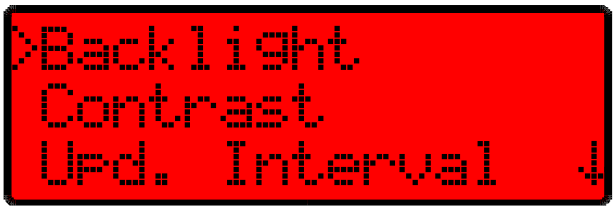
Focus for a limiting switch for a focuser working with DC motors. As no limit can be set for a real DC motor limiting switches should be used. There is no need to configure these switches, the controller realizes their function on it's own.

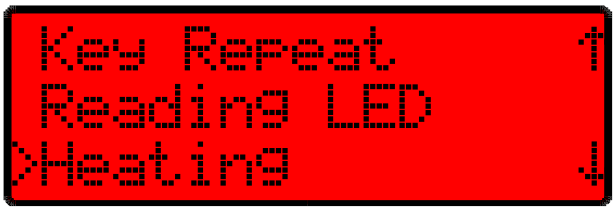
Tracking is for switches limiting tracking. Some mounts have a limited freedom of movement in RA, Losmandy G11 for example. Here it makes sense to limit tracking by limiting switches. Limiting switches may also be useful for equatorial platforms or other mountings having a limited tracking range.

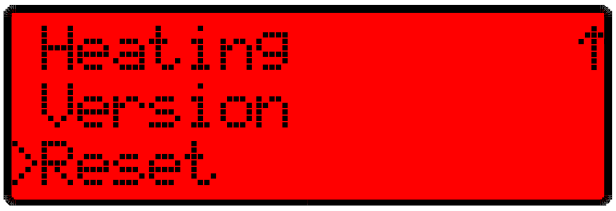
4.4.3.2 Submenu Display



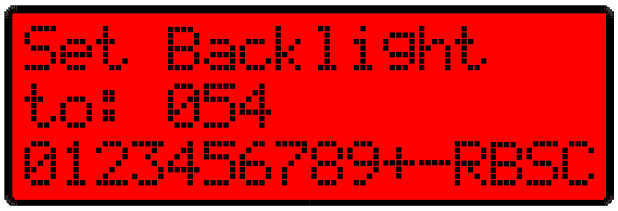
The Display Menu contains 8 subjects. ***Backlight*** , ***Contrast*** , ***Upd. Interval Key Repeat, Reading LED, Heating, HC Menu Info, Version*** and ***Reset***



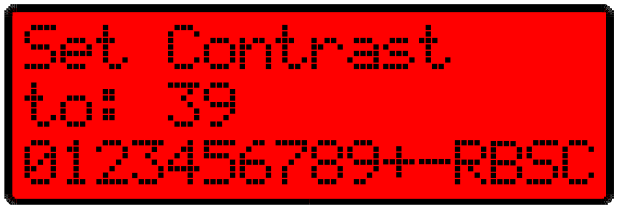




Using the ***Backlight*** menu you set the intensity of the background illumination and the menu led..

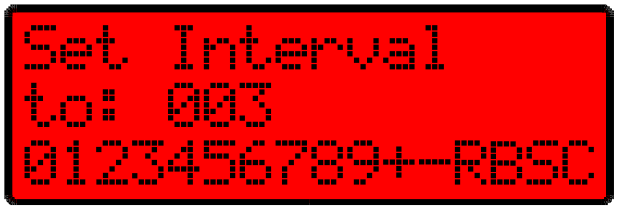


The ***Contrast*** Menu lets you control the contrast, very much a question of personal taste.

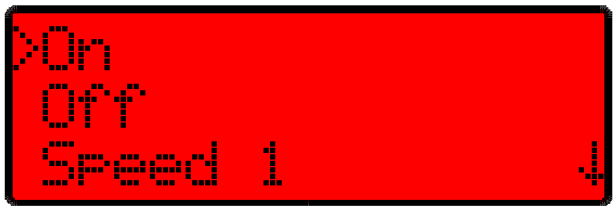


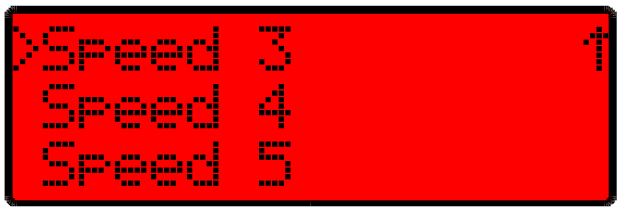
In the ***Upd. Interval*** menu you can influence the reaction time of display and controller. ***Update Interval*** names the time needed for an update of the display. For showing the coordinates this time

is given in seconds. The time until switch off of the backlight is influenced by this value too. If the input is 1 the display will be updated once a second.

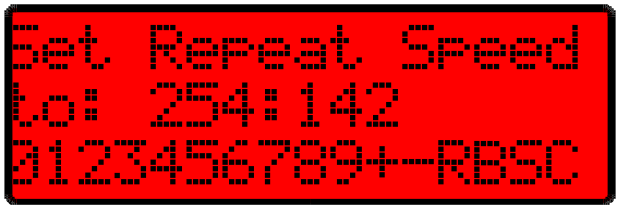


The menu ***Key Repeat*** gives the option to switch the key repetition on or off. The subjects Speed 1 to Speed 5 let you set the speed and acceleration of the key repetition.



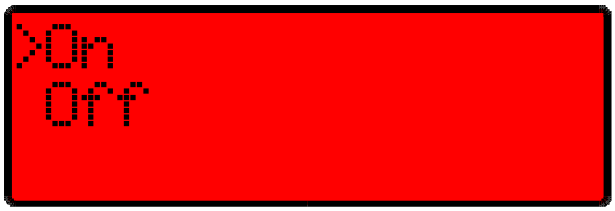


It works this way. The first number indicates the speed of the key repetition on this level. The second indicates the speed of the change to the next level, like to ***Speed 2 etc.***

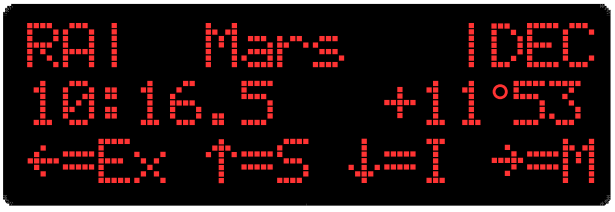


Feel free to try out a little bit, but be careful too. It is possible to set speeds that are not good for save handling any more.

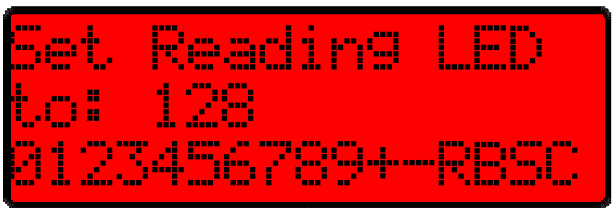
Next in the menu is **Inverse Mode** which can invert the display, which means red letters on a black background. To activate the mode choose “On”.



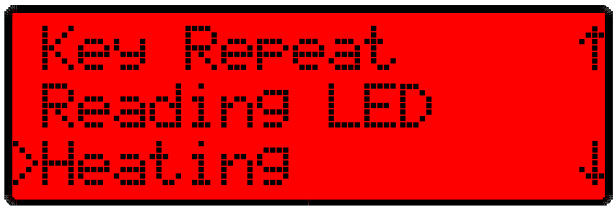
Here are some examples what an inverted screen looks like.



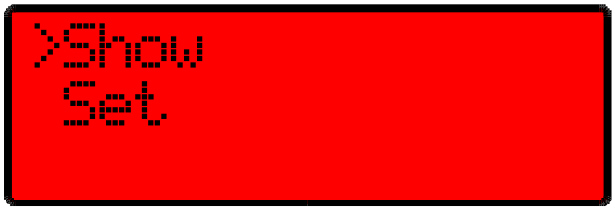
The next menu is ***Reading LED.*** You control the brightness of the reading LED in the controller handbox this way.

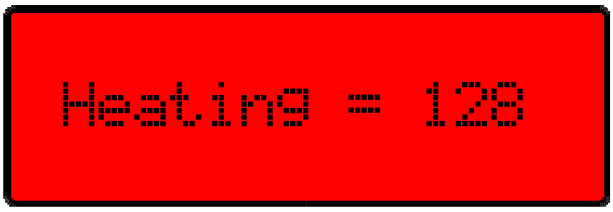


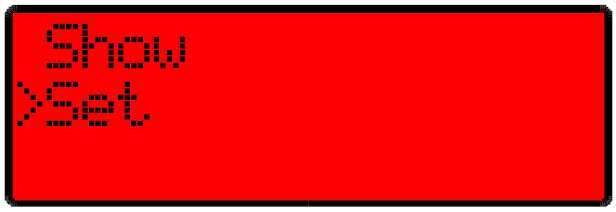
Next is ***Heating*** to control the intensity of the display's heating.

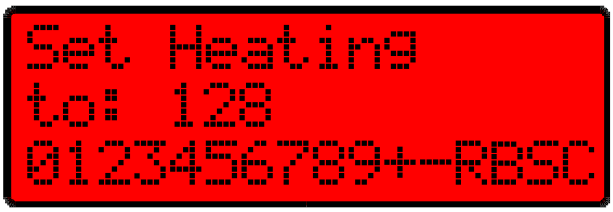


This menu contains two submenus: ***Show*** and ***Set***. ***Set*** serves to control the heating's intensity. You can set values up to 255. There is something special about value 255, it activates a heating automatic. The values 1-254 start the heating at once. Value 255 controls the heating automatically. The actual heating intensity which of course depends on the outside temperature is to be seen at Show. The arrow up / down shows that the automatic is activated. The ***Show*** menu shows the value you set at ***Set.*** After a while the display changes to the superior menu.

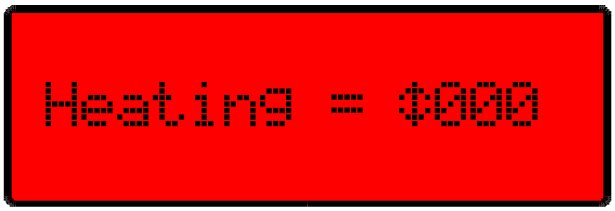




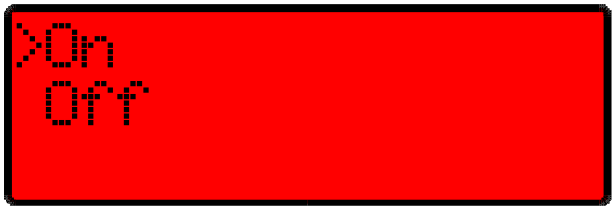


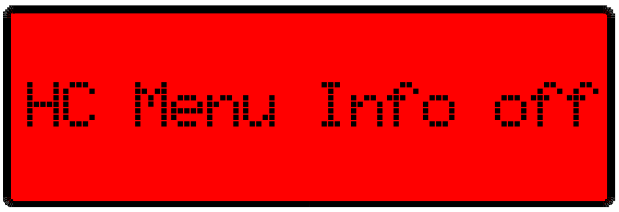


This is what the ***Show*** menu looks like if the automatic is active.



HC Menu Info enables you to make visible additional screens concerning the hand controller box menus at all times.

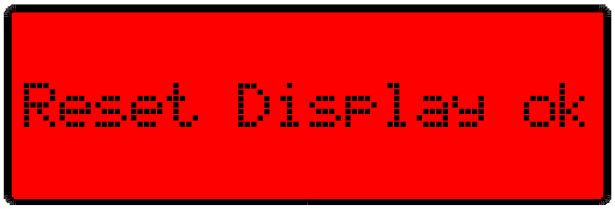




If this option is activated at every use of the hand controller box menu the actual action will be stopped to show the screen concerning the had controller box menu. If this option is not activated the hand controller box menu will only be shown if there is no need to stop another action to do so. This should only be the case with the start screen .

Next there is the ***Version*** menu. This indicates the actual Firmware Version of the display.

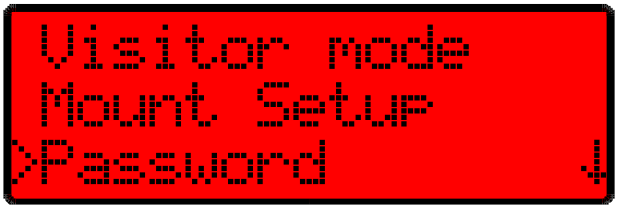
The last menu ***Reset*** makes a reset of ***all existing data and settings.*** If you see this message there is something to be done.

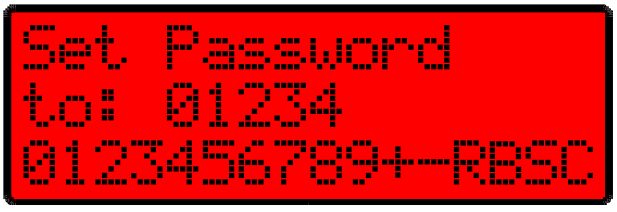


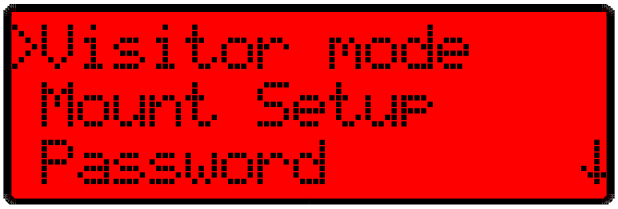
4.4.3.3 Submenu Controller

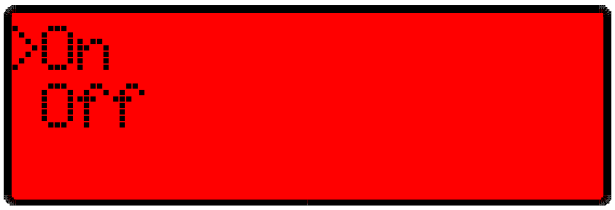
This menu contains 6 submenus: ***Visitor Mode, Mount Setup, Password, Security, Licence*** and ***Reset***

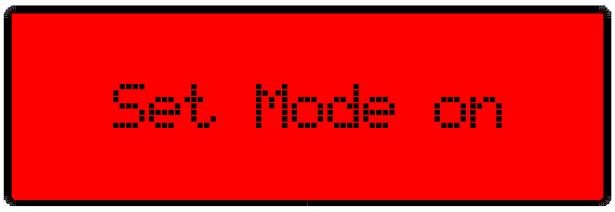
The ***Visitor Mode*** gives access to the ***RA / DEC*** buttons only. There is no access to any menus in this mode. This gives the option to let laymen handle the controller in an observatory without being afraid that they make a mess by accident. To deactivate the ***Visitor mode*** you need a password that is given to you in the menu ***password.*** As you can see you can set a 5 numbers sequence over there. The setting over there is only temporarily, if you switch the controller off and on again the ***Visitor Mode*** is working again.



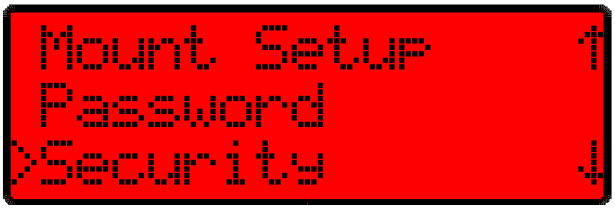


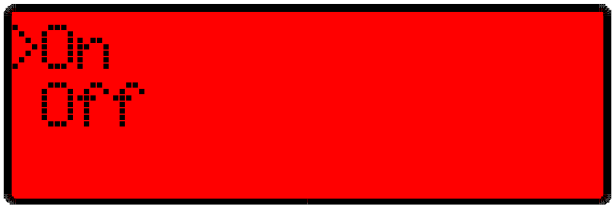


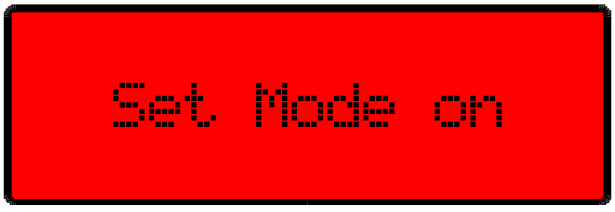




In ***Security*** this is different. Here the password is permanently valuable. So if ***Security*** is active you have to tell the password when you switch on the controller. Otherwise the controller wont do anything. This is interesting as theft protection for telescope meetings.

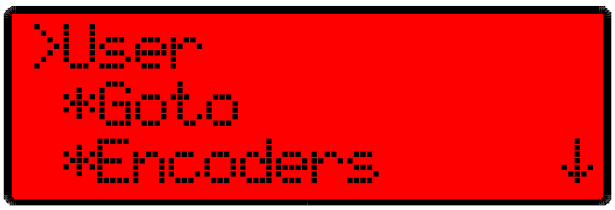


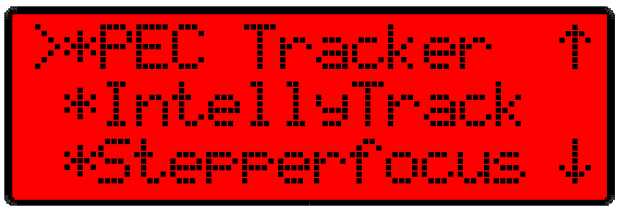


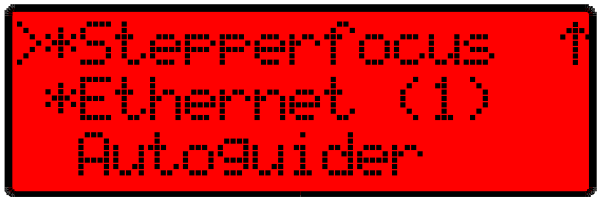


If you forgot the password there is a master password for every controller. If you do not know both you must post the controller to us. The Security cannot be deactivated without a password and there are no tricks to find out the password.

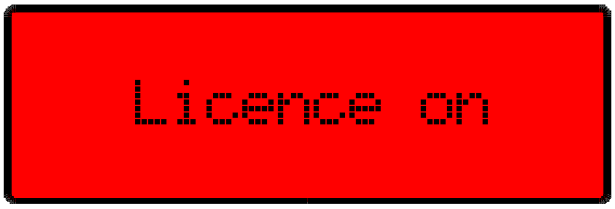
License shows which options were bought and who is the user with the Firmware license. The Elegance Photo's license is named for the user like it is the case at other PC-programs.



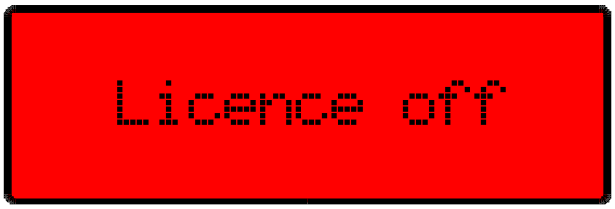




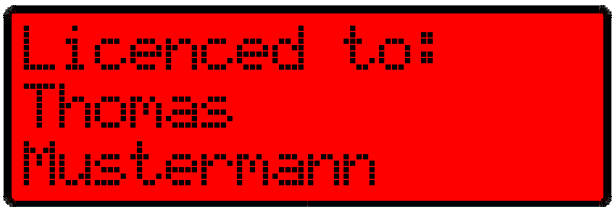
The options licensed by the Firmware a marked by a starlet. Fot the Ethernet option the number in brackets tells how many connections at a time are licensed by the Firmware. Options without a starlet are not licensed. If you click on an option with starlet you get this message.



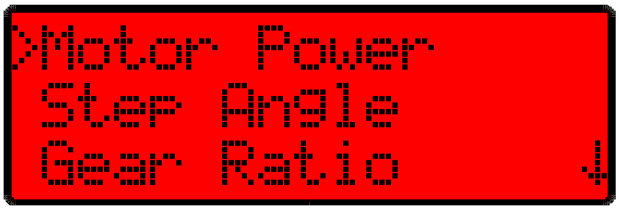
If you click on an option without starlet for sure you get this message.



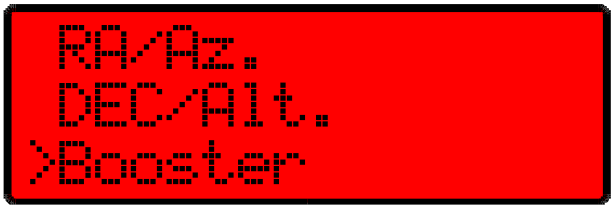
License contains the submenu User. If you click on it you will see the user for the licensed Firmware.



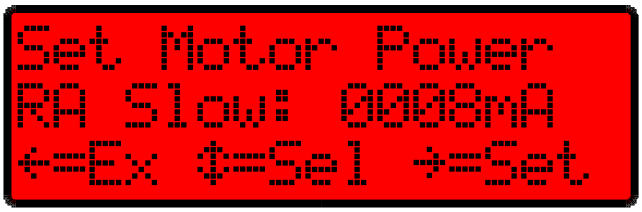
The next submenu is ***Mount Setup.*** As the name indicates this is for input of the mount's parameters. You can save and load the ***Setups*** and make use of ***Presets.*** The menu contains ***Motor Power, Step Angle, Gear Ratio, Worm Wheel, Axis Dir, Load Setup, Save Setup and Presets.*** Let's start at ***Motor Power***. This is for setting of the motor current.



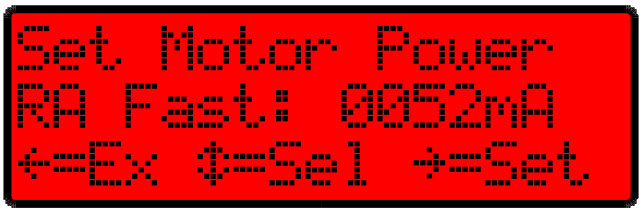
Motor Power contains three submenus



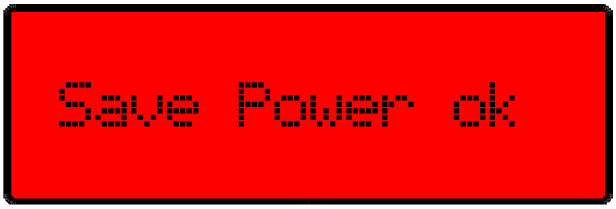
You set the motor current like this, as an example I choose the RA motor. A push on ***DEC+*** or ***DEC-*** increases or decreases the current one step. Slow indicates the standard mode. After input of the right value you save by ***RA+***.



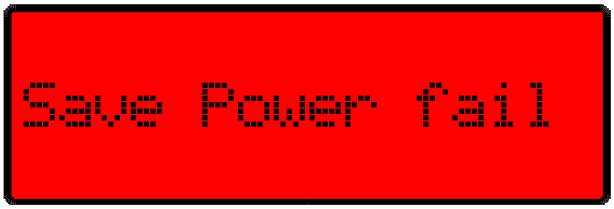
Thereafter the display changes to Boosted Mode. The input for the current needed is done alike.



After setting use ***RA+*** to save the value. This is the confirmation for the successful saving.

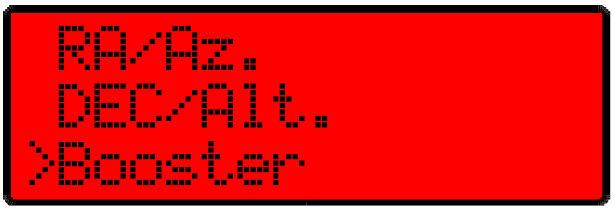


If you failed this display is shown.

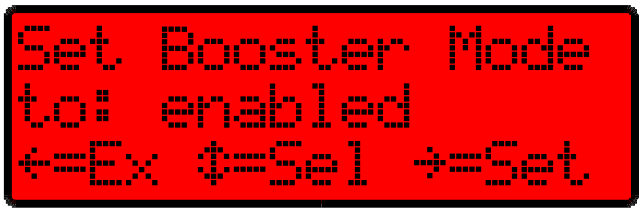


The setting for the DEC axis is alike, so I do not tell it in detail.

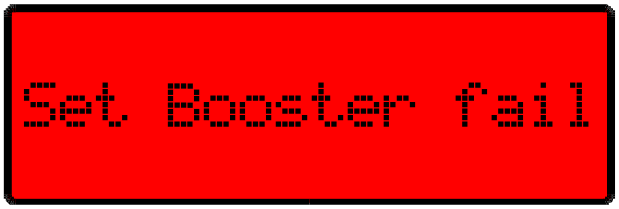
The next option **Booster** serves to activate /deactivate the internal voltage transformer of the LFE Photo V40 version.



You have 3 choices here Enabled, Disabled, and Auto Mode.



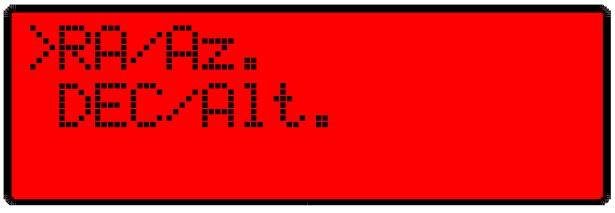
Enabled means permanently active, Disabled is inactive, Auto Mode activates the option automatically with Goto.. If there is no voltage transformer to be found in your controller this is how “failure” is shown.

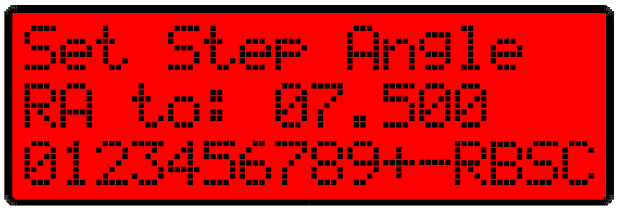


For the following submenus of the ***Mount Setup*** menu here is an advice. These subjects are an Editor to create the mount's Setups. So these values can be different from the ones for your mount. In general the procedure is like this: The parameters of the actual mount are written by hand or put in as Preset from an EEProm or SDCard and then transferred to the controller by the ***Save Setup.*** After this a ***Reset*** of the controller must be done. This is done by the ***Reset*** menu of the menu controller.

If you want to see the actual settings for the controller the ***Load Setup*** gives the option to read the parameters actually set in the controller and to check menus one for one.

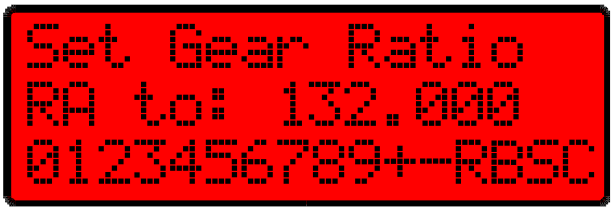
First there is the setting for the step angle of the motors. Sure this can be set for every axis independently.

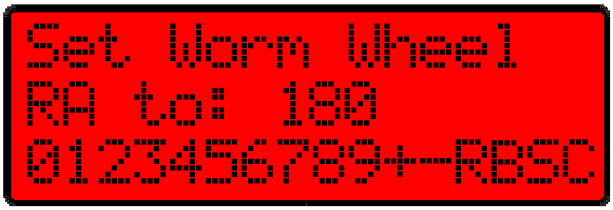




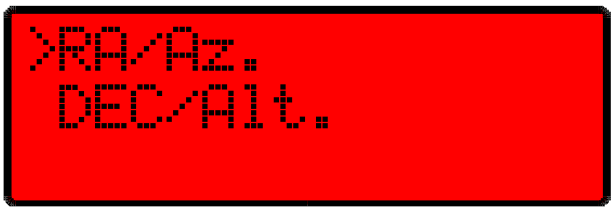
As you can see the motors have a step angle of 7,5° .

Gear Ratio and ***Worm Wheel*** are set alike, the axis one by one. I don´t explain it in detail, I just show the two menus for the RA axis.

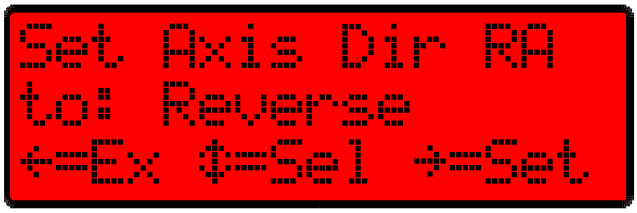




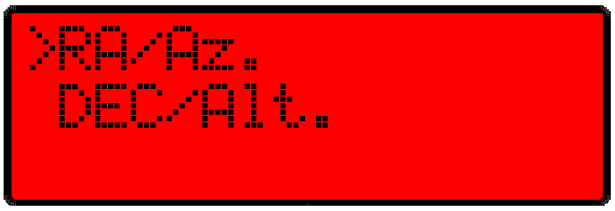
The next menu is Axis Direction = ***Axis Dir***. Here is the place for input of northern or southern hemisphere or for gears that reverse the motor's sense of revolution. This setting is also done for each axis one by one.

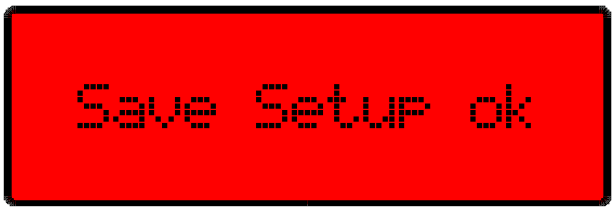


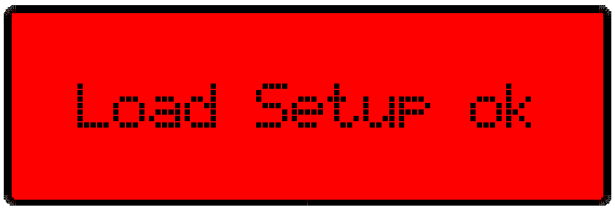
You can set Normal or Reverse. Normal is the setting for the northern hemisphere, Reverse is for the southern hemisphere.



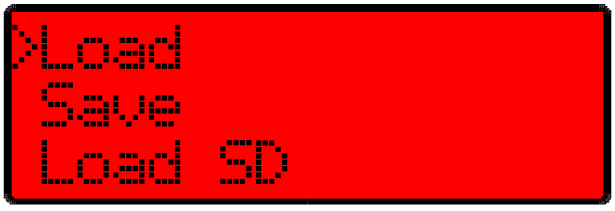
Now we take the step to the menu's next subject. ***Save Setup*** gives the option to save the settings per axis, by ***Load Setup*** they can be reloaded. ***Load Setup*** loads the settings of the controller, this means the actual settings. ***Save Setup*** saves the settings in the controller. To activate them a ***Reset*** must be performed from the menu controller.



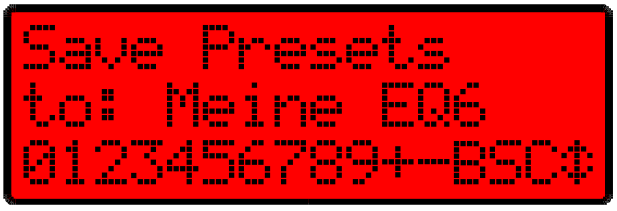




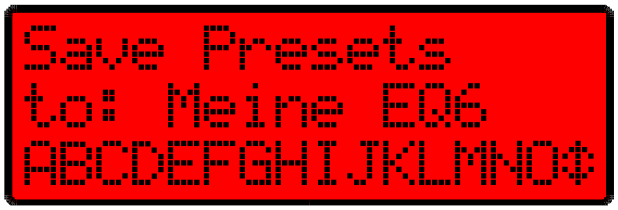
The next menu ***Presets*** contains three submenus ***Load, Save*** and ***Load SD. Load*** and ***Save*** are made to load and save out of and into the ***EEPROM. Load SD*** serves to load Presets from the SD Card

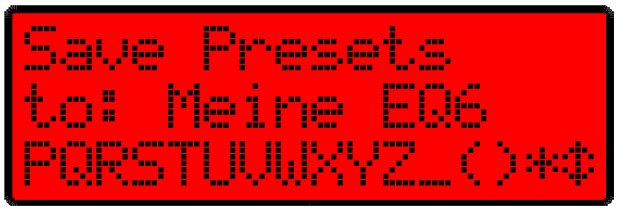


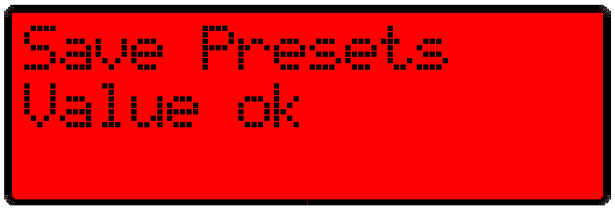
I shall start at ***Save***.



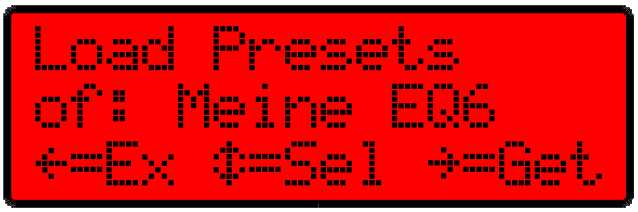
As you can see the right hand arrow offers the option to change to input of letters. Four more lines for input are available. Up to 11 signs are possible. You save the names by ***S*** in the first menu.



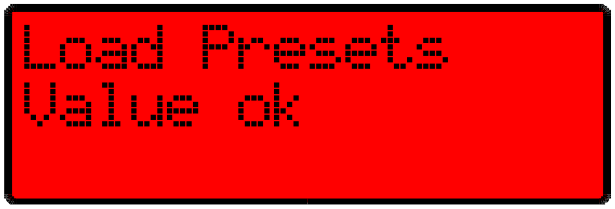




You get this message after saving a ***Preset.*** Up to 5 ***Presets*** can be saved. Now let's have a look how ***Presets*** are loaded. This is done by ***Load.***

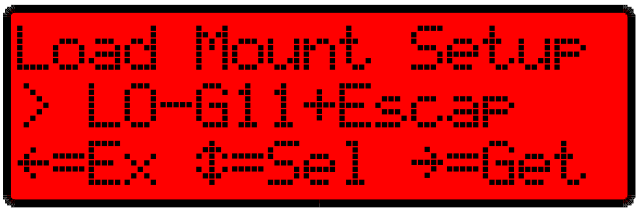


Using ***Sel*** you select the ***Preset*** you want, by ***Get*** you load it.

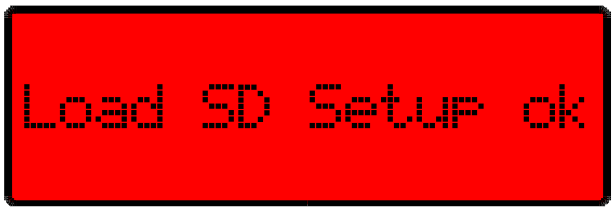


Here once again the Preset is loaded into the Editor. You can check it and transfer it to the controller by ***Save Setup.*** A ***Reset*** will activate it.

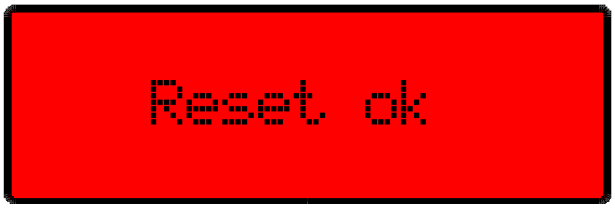
Now let's talk about the last submenu ***Load SD***. You can use it to load as many Setups from the SD card as you like. We already invited you to publish your Setups in the forum. There is also a little application that creates a file compatible to an SDWriter with Index 100, which you can use to write onto the SD Card. You find the link in the Linklist.



Here you see the name of my Setup on the SD Card. By ***Sel*** you can select the Setup, by ***Get*** you can load it.



This is the confirmation. To laod these Presets into the controller is done the same way as before. This means you load, controll, transfer to the controller using ***Save Setup*** and perform a ***Reset*** afterwards.



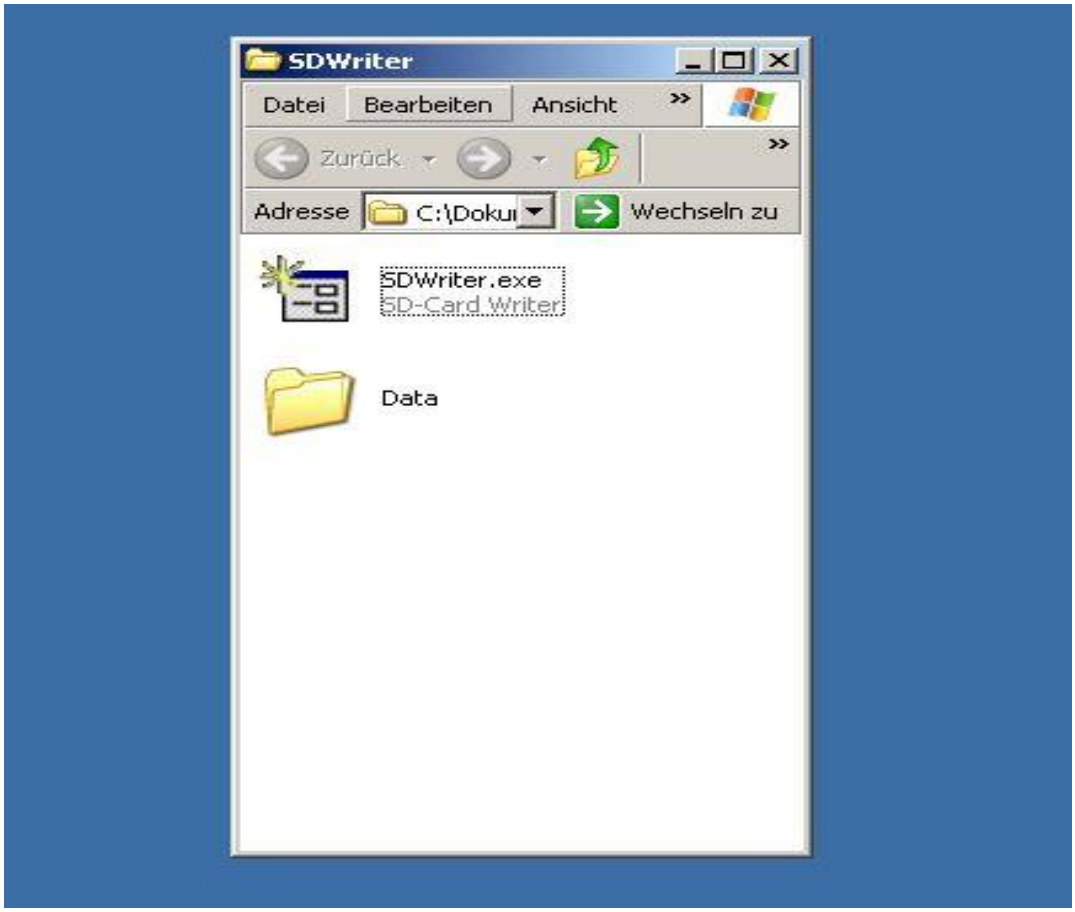
You leave the Display mode by ***Exit***

4.5 The SD Writer to write on SD cards

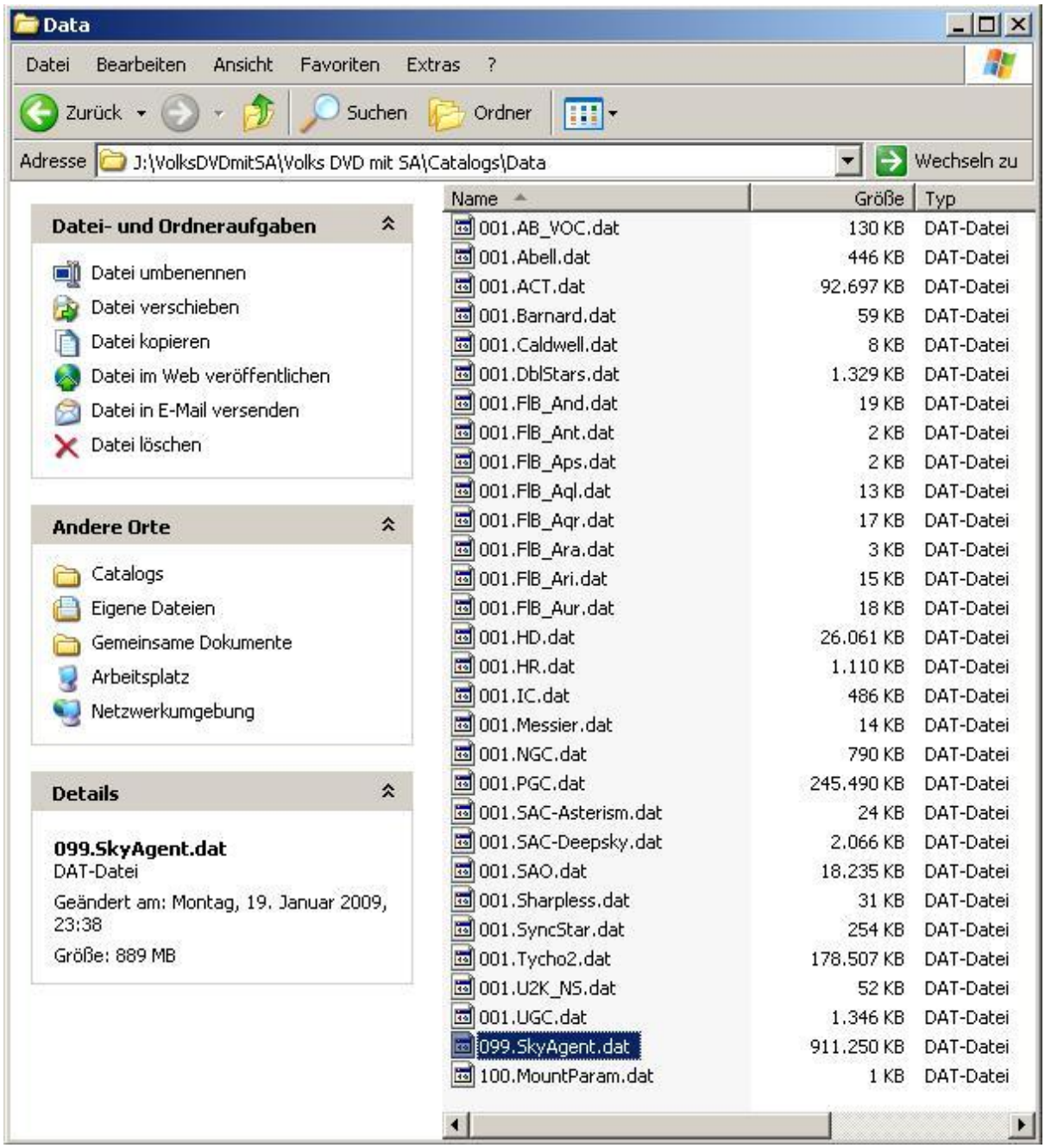
If you want to make use of ***Catalogs*** in the ***Goto menu*** you need an SD Card containing catalogs. I shall give you a brief instruction how to get the catalogs onto the SD Card. First of all you need the program SDWriter. It is to be found on the Elegance Photo DVD or at this Link: Anwendung zum Schreiben der SD Karte

Scroll downwards on the page a little bit and download the program.

First you create a directory and you unzip the program there. Then you create another directory within the first one named ***Data.*** This is what it should look like after.



You write copies of the prepared catalogs into the directory. This could look like this for example. Be aware that the SDWriter shows problems to treat files with a mixture of two- and three sign index (like 01.xx and 100.xx for example). This is the reason that the indexes must have three signs (001.xx and 100.xx for example).



Then one SD Card should be prepared first. To enable a certain identification the SDWriter needs a clear-cut name of the memory unit. It writes a format of it's own onto the SD Card. This might cause a lot of problems for the data of a hard disc. The procedure works well anyway. I have written onto many cards and my hard disc has not been deleted.

You use the software at your own risk anyway.

To prepare the SD Card this must be formatted by the ***FAT !!!*** file system.

At the same time you unequivocally name it ***MCU_LF_SD.*** Over here I used a 1 GB card.

Then you start the SDWriter and insert the card if it is not in the slot still.

SD-Writer
Insert SD-Card and press Start ...
Create Sky Agent Database only
Write SD-Image file to SD-Card
Start
(c) 2008 by Anand Rajiva, http://forum.rajiva.de

Here you can see the start screen of the new SDWriter. You need the recently created function "***Create Sky Agent Database only***" to crate this data base. The second new option "***Write SD-Image file to SD-Card*** " is not available yet. It shall serve to copy the image of the whole SD Card in the near future.

To create the Sky Agent database all catalogs in the data tables are examined and the offsets are written into the database.

Depending on the computer's capacity this can some hours or even some days. I started the program in the early evening and in the next morning the data base had been created. Computer 2,8 GHZ AMD with 1 GB main memory.

You can do it the easy way too and just download the Sky Agent database. The Linklist tells you where you can find the link in the forum. We appreciate the effort of member Christoph (webturtle) who crated the database and made it accessible to anyone.

Pay attention: This will just save you the work to crate the data bank. Anyway you are obliged to write it on the SD card using the SD writer. Otherwise the card will not work with the controller.

SD-Writer
Insert SD-Card and press Start ...
Create Sky Agent Database only
Write SD-Image file to SD-Card
Start
(c) 2008 by Anand Rajiva, http://forum.rajiva.de

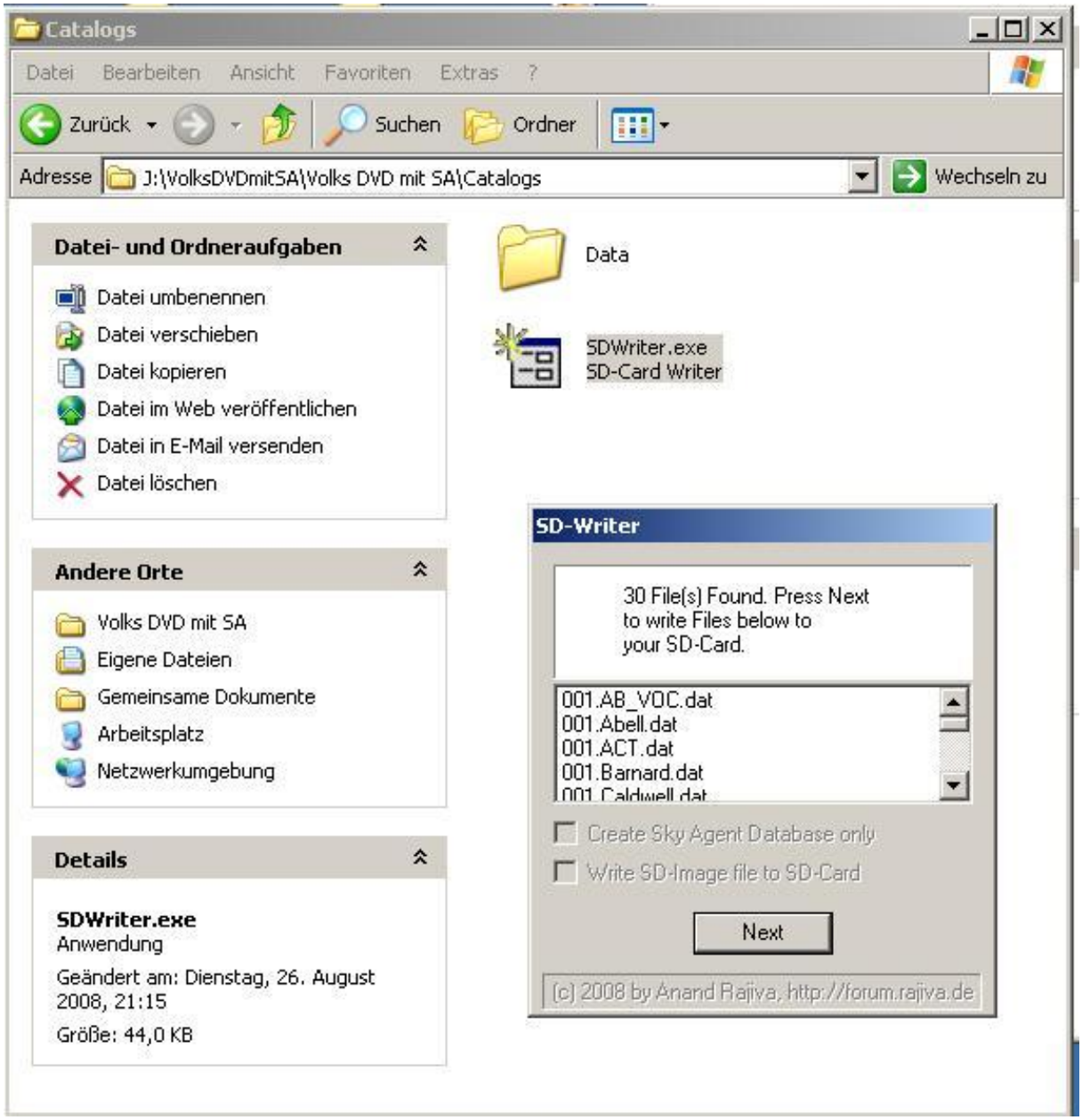
After the option has been selected and the click on Start the program will examine the existance of the catalogs and send this message.

You can click on Next now. The data base starts to be crated now, the catalog just worked on will be indicated. The creation of the data base is complete when all catalogs have been examined and the offsets have been written into the data base. Now all data can be transferred to the SD Card.

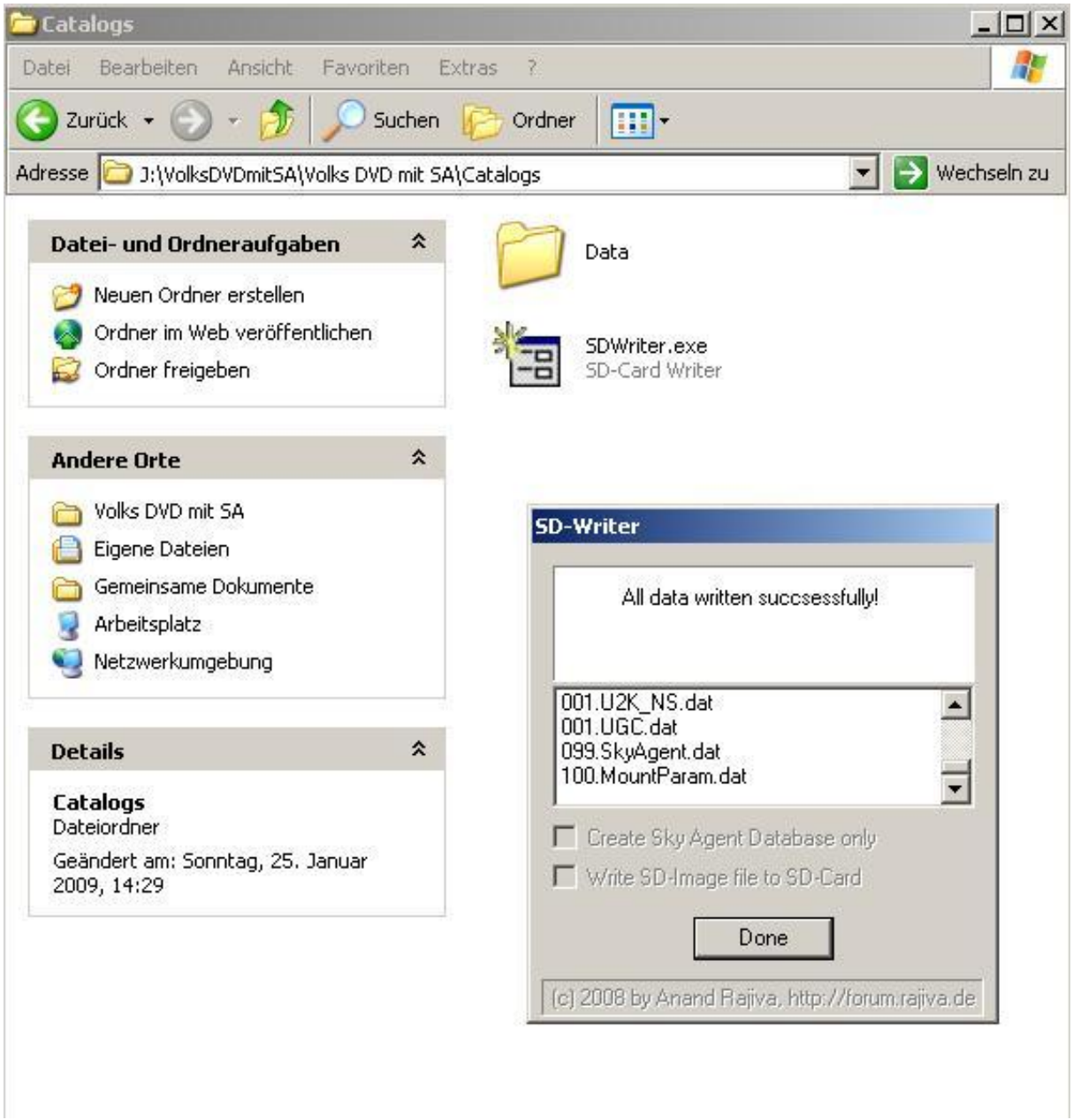
SD-Writer
Insert SD-Card and press Start ...
Create Sky Agent Database only
Write SD-Image file to SD-Card
Start
(c) 2008 by Anand Rajiva, http://forum.rajiva.de

After click on Start a valuable SD Card is searched.

If a valuable SD Card has been found the program will show a table of all catalogs and the Sky Agent database.



Here all existing catalogs and the Sky Agent database have been named. Another click on Next will write them onto the Card.



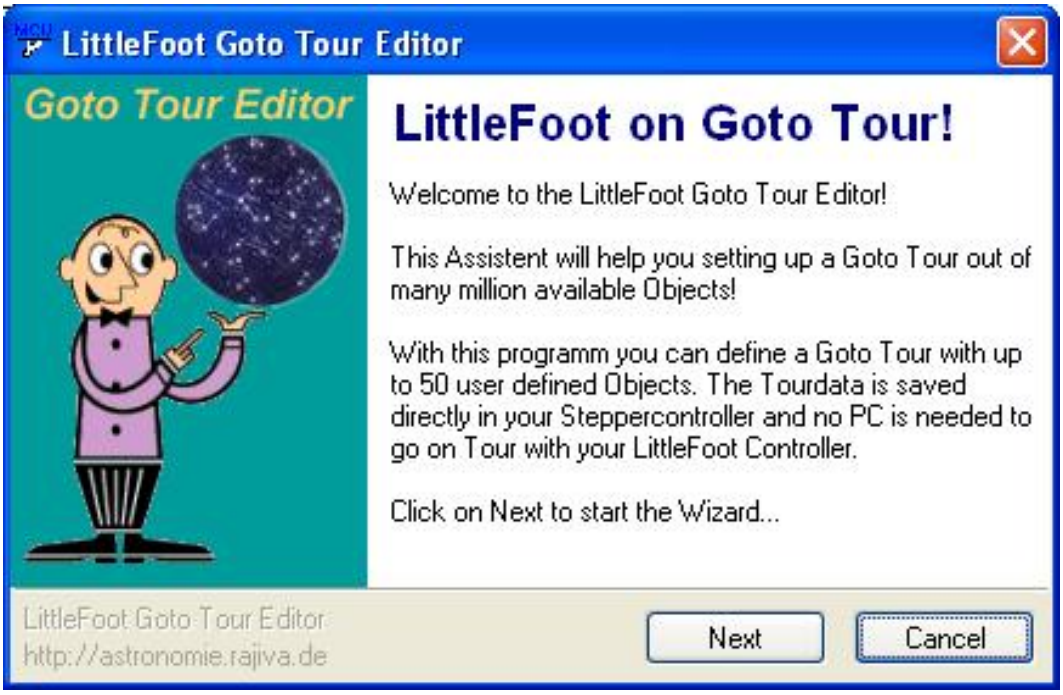
If you can see this screen everything is ok and the data are saved on the card.

Enjoy yourself with the catalogs and the Sky Agent.

4.6 The GotoTour Editor

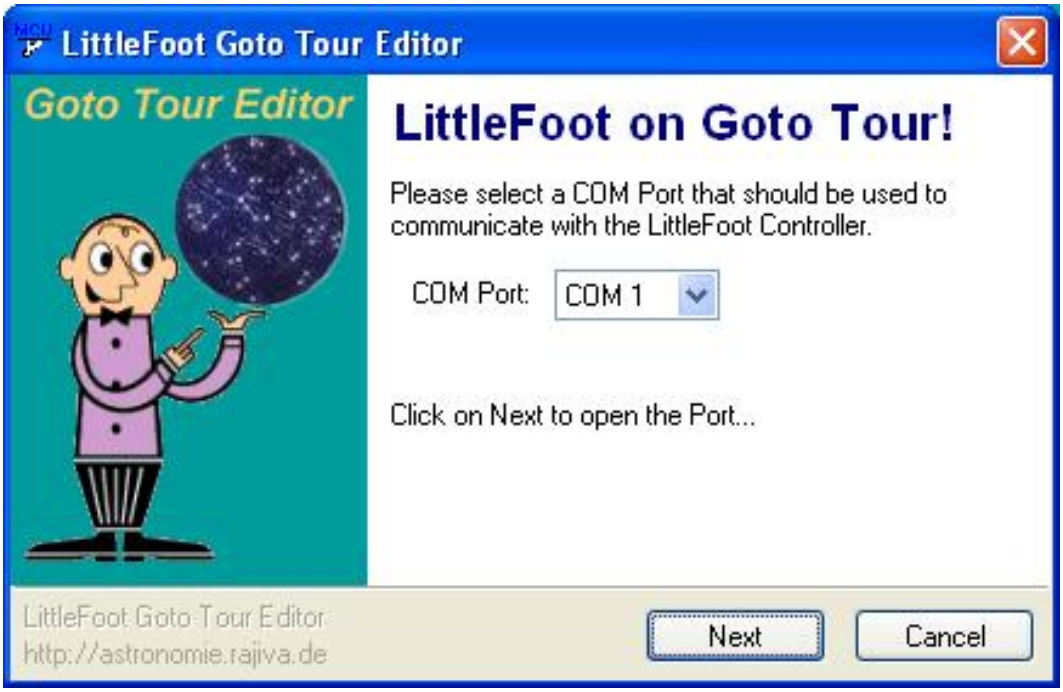
The LittleFoot Goto Tour Editor is a little tool that gives an easy option to save list of objects defined by the user on the controller. You can select the objects and do the Goto using the Goto Tour menu. This chapter shall tell you how to use this little tool.

If you start the Goto Tour Editor the start screen will give you a brief information about the options.

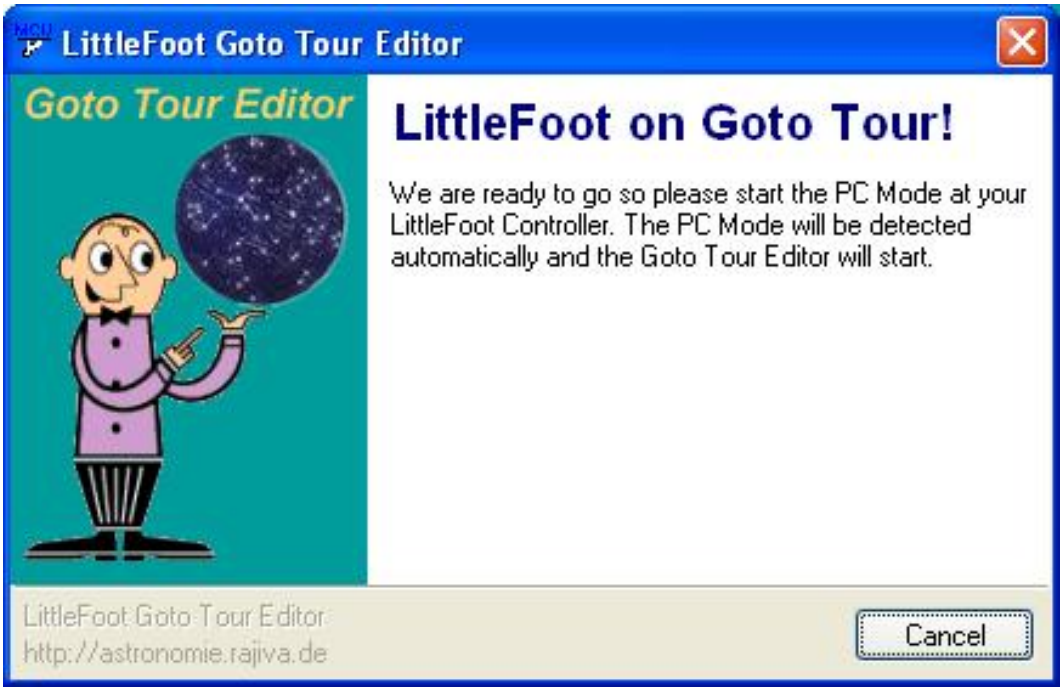

LittleFoot Goto Tour Editor
Goto Tour Editor
LittleFoot on Goto Tour!
Welcome to the LittleFoot Goto Tour Editor!
This Assistent will help you setting up a Goto Tour out of many million available Objects!
With this programm you can define a Goto Tour with up to 50 user defined Objects. The Tourdata is saved directly in your Steppercontroller and no PC is needed to go on Tour with your LittleFoot Controller.
Click on Next to start the Wizard...
LittleFoot Goto Tour Editor
http://astronomie.rajiva.de
Next
Cancel

The Tour Editor does not need any installation but the catalogs must be found in the sub file Data, like it has been the case for the SDWriter. The object catalogs do not need any preparation for the Goto Tour Editor nor need they to be saved in the controller. These up to 50 user defined objects will be treated and stored in the controller completely independent from the other Goto catalogs. So you do not need an SD Card to make use of the Goto Tour.

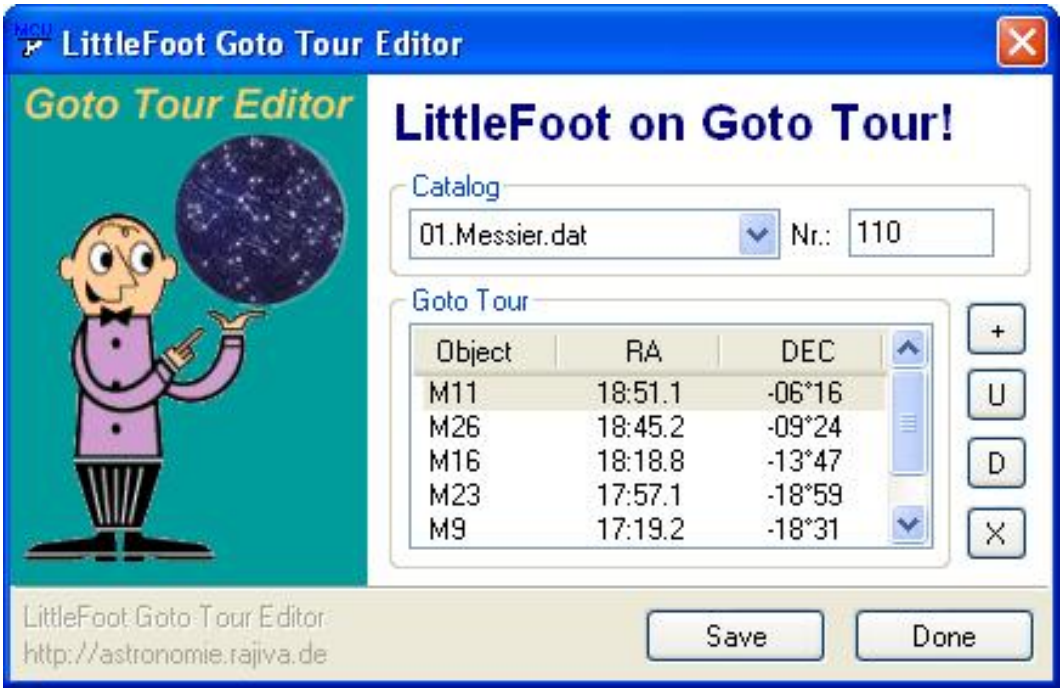
You start with a click on „Next“. The next screen serves to select a serial interface needed for communication.


LittleFoot Goto Tour Editor
Goto Tour Editor
LittleFoot on Goto Tour!
Please select a COM Port that should be used to communicate with the LittleFoot Controller.
COM Port:
COM 1
Click on Next to open the Port...
LittleFoot Goto Tour Editor
http://astronomie.rajiva.de
Next
Cancel

After selecting the interface you continue by „Next“.


LittleFoot Goto Tour Editor
Goto Tour Editor
LittleFoot on Goto Tour!
We are ready to go so please start the PC Mode at your LittleFoot Controller. The PC Mode will be detected automatically and the Goto Tour Editor will start.
LittleFoot Goto Tour Editor
http://astronomie.rajiva.de
Cancel

This screen indicates that the LittleFoot Goto Tour Editor awaits the connection to the controller. So you start the controller und select the PC Mode in the Extras menu. The program will recognize the active PC Mode automatically and switch to Editor Mode.



As Catalog you can choose any catalog contained in the sub file of object catalogs. On the right you can fill in an object number, the pushbutton „+“ will attach it to the list. The buttons „u“ and „D“ give the option to set marked object at another place in the list. „X“ will delete a marked object from the list.

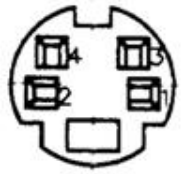
For memory-economy reasons the name of a Goto-Tour object can only be 5 signs long. As the objects names in the catalog consist of 15 signs the names will be cut after 5 signs in the Tour Editor. May be that you do not like the object's name in the list, so you have the option to edit the name. To do this you select the object and click on the object's name another time. You can now modify the name and save the modification by Return.

After you modified the object list according to your needs you „Save“ it on the controller. “Done” will close the Tour Editor and leave the “PC Mode” automatically.

5 Pin assignments

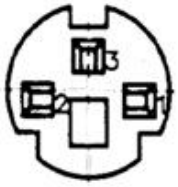
5.1 Pin assignments oft he front surface

5.1.1 4 pol. Video socket



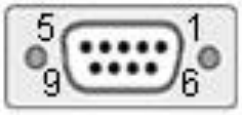
1	GND
2	Video In
3	+ 9V
4	+12V

5.1.2 3 pol. DSLR socket



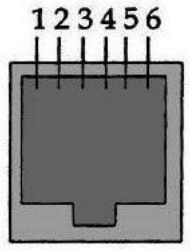
1	Common
2	Shutter
3	AutoFocus

5.1.3 9 pol. Focus socket



1	Focus – (OC)
2	Focus Speed (OC)
3	+5V
4	Focus+(OC)
5	GND
6	Stepperfocus A´
7	Stepperfocus A
8	Stepperfocus B`
9	Stepperfocus B

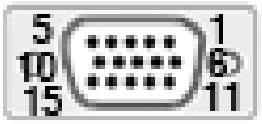
5.1.4 6 pol. ST-4 socket



1	Nicht belegt, optional +5 V *
2	GND
3	ST-4 R
4	ST-4 U
5	ST-4 D
6	ST-4 L

*Normally there is no occupancy on Pin 1, as there are hardly any guiding cameras that need 5 Volt voltage from this pin. Anyway if you should need it you can set 5 Volt on Pin 1 using the jumper JP-3.

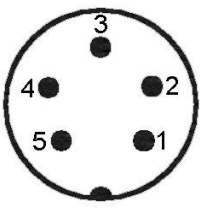
5.1.5 15 pol. Handbox socket



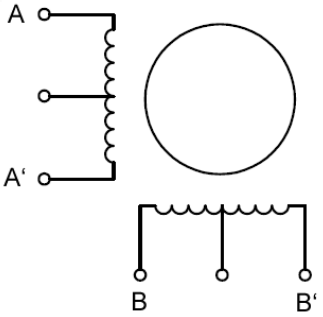
1	SDA
2	SCL
3	SQWT
4	TxD
5	RxD
6	GND
7	PAD 8
8	PAD 9
9	TxD1
10	RxD1
11	Tx1In
12	RxD1Out
13	+5V
14	+3,3V
15	40V Booster

5.2 Pin-occupancies of the rear surface

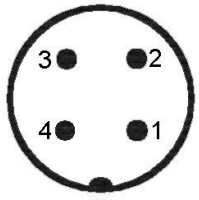
5.2.1 5 pol. RA and DEC Plug



1	B
2	A
3	Frei (Power)
4	B`
5	A`

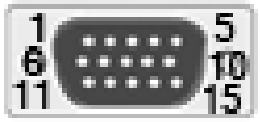


5.2.2 4 pol. Power Plug



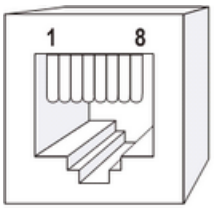
1	+12V - + 30V
2	GND
3	12V Jumper
4	12V Jumper

5.2.3 15 pol. LF-Extension Plug



1	+3,3V
2	+5V
3	+9V
4	+12V
5	Meridian Switch
6	Fan Control (OC)
7	CBUS3
8	CBUS2
9	CBUS1
10	CBUS0
11	SCL
12	SDA
13	GND
14	RX CAN Ext 1
15	TX CAN Ext 2

5.2.4 8 pol. Encoder socket



1	RA-B
2	+5V
3	RA-A
4	GND
5	DEC-B
6	+5V
7	DEC-A
8	GND

5.2.5 9 pol. RS232/USB plug

1	TX Video
2	RX CU
3	TX CU
4	RX Video
5	GND
6	USB +5V
7	USB D-
8	USB D+
9	USB GND

OC means Open Collector Exit

If you should doubt how to connect it, please ask first! Problems can be easily solved normaly, a wrong occupancy can cause severe failure.

6 Updates

The LittleFoot Elegance Photo Firmware is built up of three parts, the central unit's firmware, the hand controller boxes firmware, and the firmware for the video and LAN processor. All three processors are closely connected and result in a fast and very modern multiprocessor system that can be easily improved without extra expenses in the future.

The Firmware of the LittleFoot Wireless Controller consists of two parts, the software for the receiver and the one for the hand controller box.

Keep in mind that if you updated the Firmware of the central unit (Little Foot Elegance Photo) the Security mode is active again. To deactivate it you need the masterpassword. This is also the case for later updates. Also keep in mind that an update of the central unit is not possible with the security mode active.

6.1 How to load single updates

If you want to exchange the software of a processor there is no need for a screwdriver and no need to buy anything. All Firmware updates can be easily installed with your own PC making use of a modern Update program. There is only one update program for all three processors, a menue guides you during the whole update process step by step.

At start of the Update program a first screen gives some information.

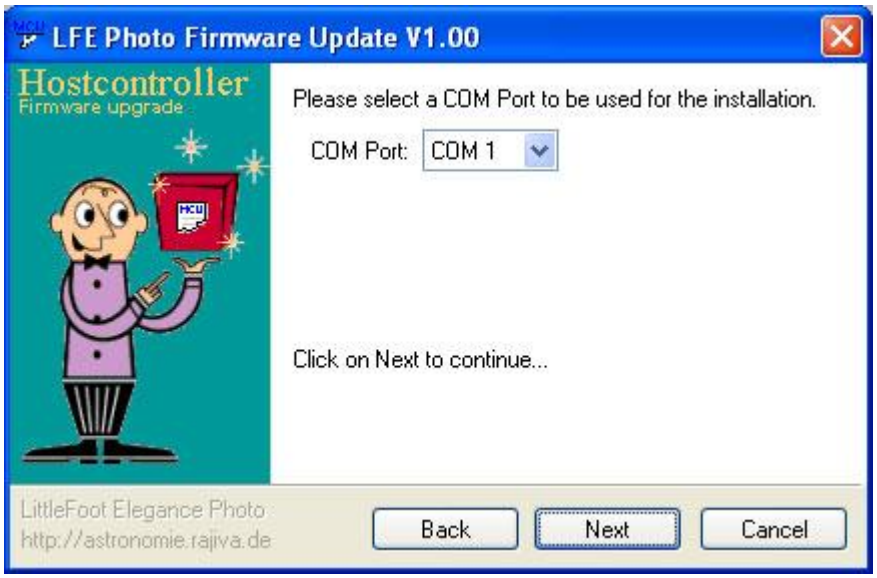
LFE Photo Firmware Update V1.00
Hostcontroller
Firmware upgrade
LittleFoot Elegance Photo
Firmware Versions 5.50.5.00.1.00
This Programm and the LittleFoot Elegance Photo Firmwarefiles are Copyright protected!
Firmware Serial Number: 750
Licenced to: Anand Rajiva
Please check that the Firmware Serial number matches with the Serial number of your Steppercontroller.
Click on next to confirm the numbers.
LittleFoot Elegance Photo
http://astronomie.rajiva.de
Next
Cancel

The line „Firmware Versions“ gives a list of the operating system's versions contained in the program. „5.50.5.00.1.00“ in the above example tells that the central unit's version is V5.50, that of the hand controller box V5.00 and the Video/LAN processor's V1.00

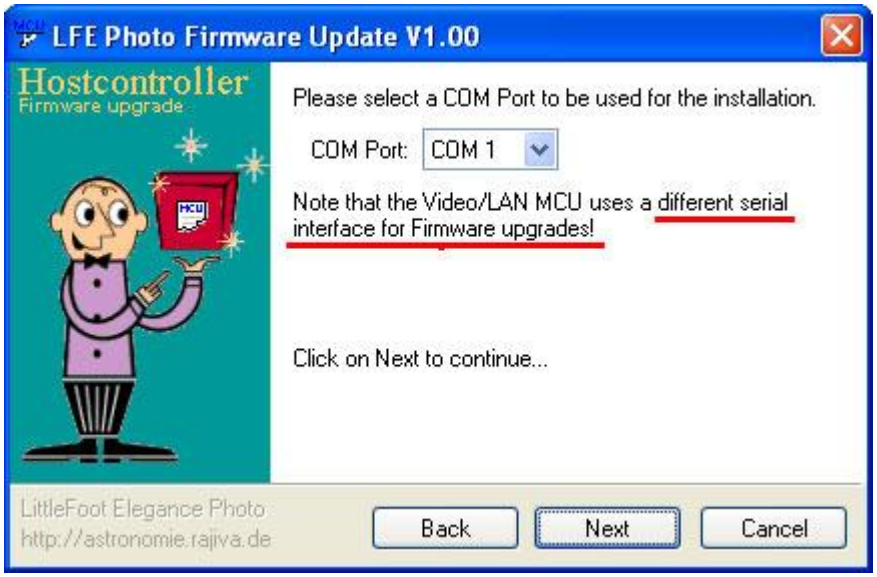
Underneath you see the serial number of the controller for which the update is intended and the license holder. Keep in mind that the that the license is for the person and not for the controller, like it is common for PC software too. There is a copyright for the update software and the controller's firmware, even if the operating software is already installed in the controller it may only be used by the license holder. The license holder is to be seen on the display here.

If this data are ok you can proceed to the next step by „Next“. Here the license treaty is shown and ***must*** be accepted before you can proceed. After that you can select the operating software that shall be installed.

As you can see there is a choice for every processor, central unit(LFE Photo), wire connected hand controller box (LFE Photo Display), Video/LAN processor (LFE Photo Video/LAN), wireless hand controller box (LFE Photo Wireless Handcontroller) and the wireless receiver (LFE Photo Wireless Receiver) . The first option offers another option within „Use DirectBoot“. I shall tell you about this option later on, you will not need it usually. After you have chosen the Firmware you want to install you continue by „Next“.



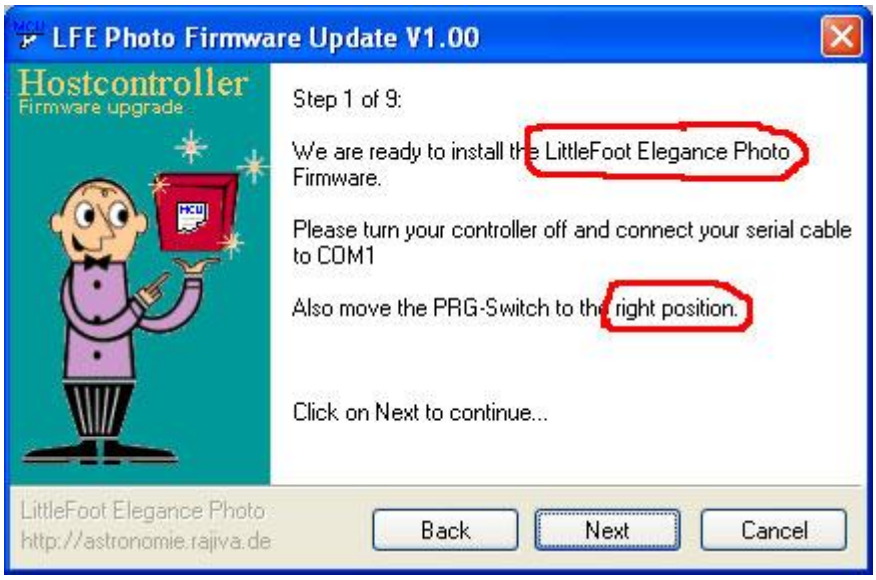
Here you choose the PC interface you want to use. Confirm by „Next“. For updates the Video/LAN Processor uses another serial interface at the controller. The update must have been activated by the display before, have a look over here! The screen points out this fact when you choose the Video/LAN Firmware.



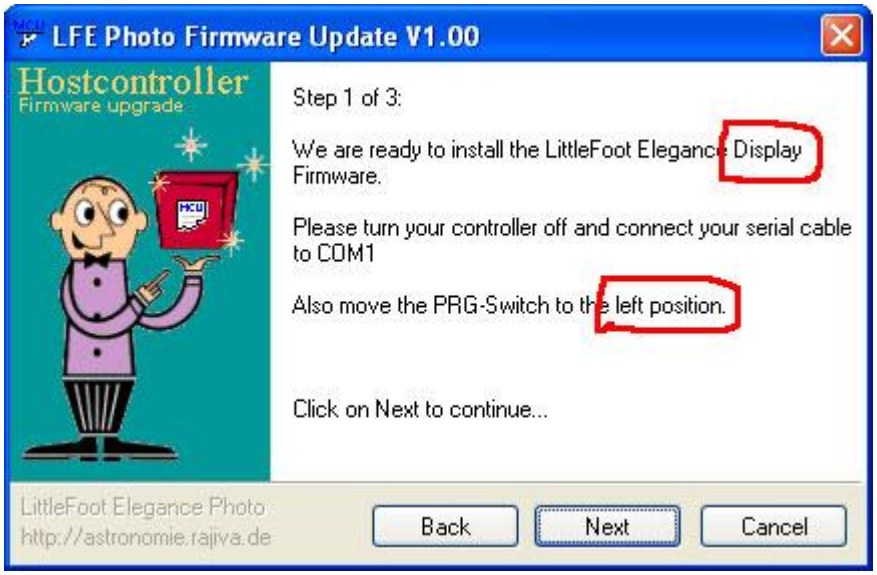
The Wireless Hand controller and the Wireless Receiver are activated directly by the built in USB interface without help of the central unit. So there is no need to set the switches in program position. Keep in mind that the receiver must be disconnected from the central unit before you connect it to the USB interface.

After the interface's confirmation by „Next“ you can start the very installation of the firmware. Corresponding to the selected firmware the screen will tell you how to set the program-switch above the socket for the LFE Photo's hand controller box.

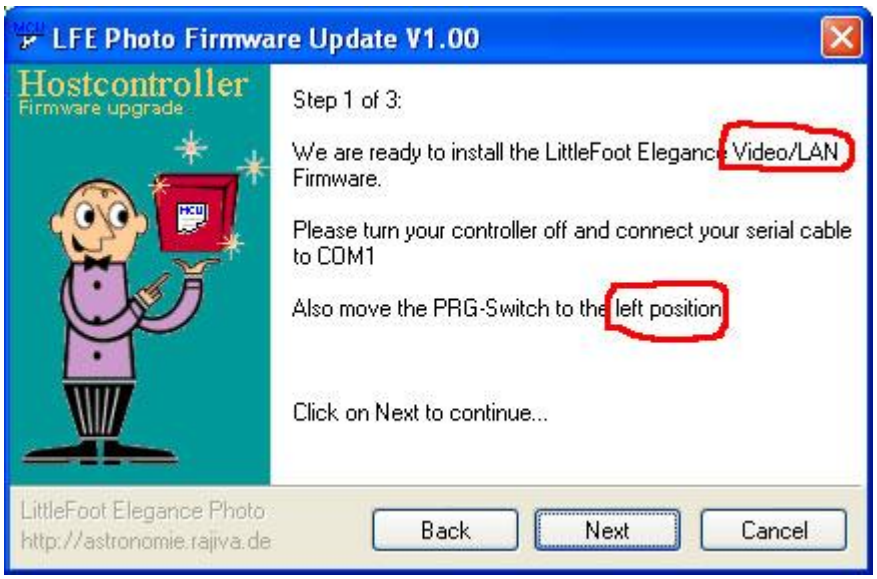
For the central unit's firmware, right:


LFE Photo Firmware Update V1.00
Hostcontroller
Firmware upgrade
Step 1 of 9:
We are ready to install the LittleFoot Elegance Photo Firmware.
Please turn your controller off and connect your serial cable to COM1
Also move the PRG-Switch to the right position.
Click on Next to continue...
LittleFoot Elegance Photo
http://astronomie.rajiva.de
Back
Next
Cancel

For the hand controller boxes Firmware, left:


LFE Photo Firmware Update V1.00
Hostcontroller
Firmware upgrade
Step 1 of 3:
We are ready to install the LittleFoot Elegance Display Firmware.
Please turn your controller off and connect your serial cable to COM1
Also move the PRG-Switch to the left position.
Click on Next to continue...
LittleFoot Elegance Photo
http://astronomie.rajiva.de
Back
Next
Cancel

For the Video/LAN Processor's Firmware, left:


LFE Photo Firmware Update V1.00
Hostcontroller
Firmware upgrade
Step 1 of 3:
We are ready to install the LittleFoot Elegance Video/LAN Firmware.
Please turn your controller off and connect your serial cable to COM1
Also move the PRG-Switch to the left position
Click on Next to continue...
LittleFoot Elegance Photo
http://astronomie.rajiva.de
Back
Next
Cancel

Pay attention that you need another wire to update the Video/Lan processor. The RX and TX wires are connected to the pins 1 and 4, contra dictionary to their specification RS 232, as the Main and Display MCU are already connected to the pins 2 and 3. Have a look at picture 5.2.5 of this page.

After you confirmed this setting by „Next“ the Update assistant will start the update of the operating system. There is nothing special about it, just follow the assistant's instruction.

6.2 Special hints for the Do It Yourself

Because there is no operating software installed if you build yourself some special circumstances only about the first installation of Firmware must be kept in mind. Even if you do not want to use some options, the Video and/or LAN Interface for example, the Firmware for function ***must*** be installed!

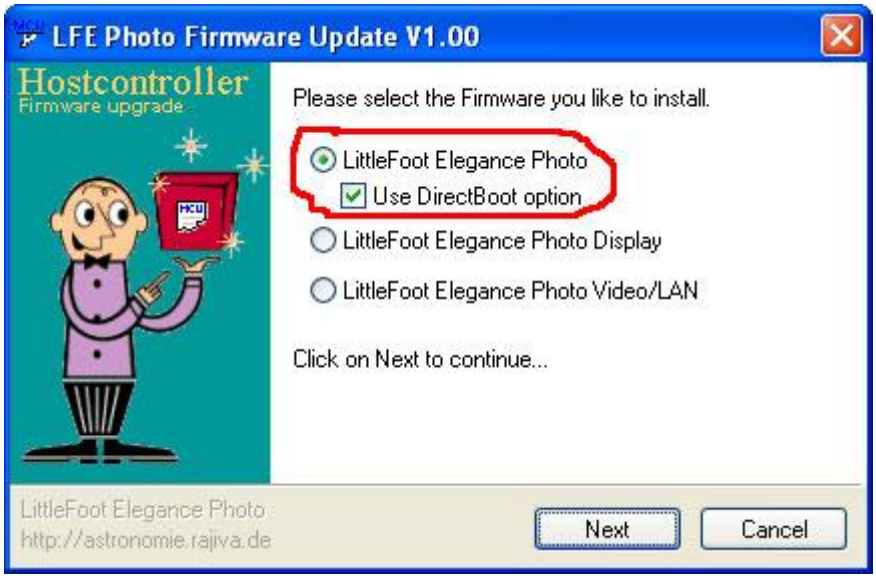
For the Firmware's first installation this succession is obligatory!

1. Firmware for the Video/Lan Prozessor

2. Firmware for the Hand controller box

3. Firmware for the Central unit

The installation itself is described in the chapter „load of updates“. There is something special about the Central unit. Because there is not any Firmware for the Central unit yet and the assistant cannot find it therefore you must select the extra option „Use DirectBoot“ for the Central unit.



After selecting this option the control of the software that has already been installed is omitted, the installation of the Firmware will start at once. Further steps are the same as for a normal Firmware update.

6.3 Hints for the Case of failed Updates

The Firmware update is a save action that has been tested 100 times. To avoid difficulties no other program should be active at the same time, the screen saver should be deactivated. Anyway it an interruption of the update could take place, with a breakdown of the electric supply for example. The software already installed would be lost. To prevent this a security measure makes part of the Update Software. It is called „DirectBoot“ and is needed for the Central unit only. The operating software of the hand controller box and the Video/LAN processor do not need this function as they are so called „Clients“ of the Central unit. If the Firmware update failed the installation of the Central unit's software is done like a first installation. We told you how to do in the chapter for do it yourselfers.

7 Linklist

LittleFoot ASCOM Treiber und ASCOM Plattform

http://ascom-standards.org/Downloads/ScopeDrivers.htm

http://forum.rajiva.de/forum/phpBB2/viewforum.php?f=43

Focus-Control using a direct current motor

http://forum.rajiva.de/forum/phpBB2/viewtopic.php?t=92&highlight=motor+focus

Circuit diagram for fan controller

http://forum.rajiva.de/forum/phpBB2/viewtopic.php?t=413

GPS Projekt

GPS-Projekt Link

Objektcatalogs with or without Sky Agent Database

Objektkataloge und Sky Agent Datenbank

Mountsetups for SD-Card

http://forum.rajiva.de/forum/phpBB2/viewtopic.php?t=2128

Which Encoders can be used

Encodersupport

Thanks

I should like to say „thank you“ to the members of the forum and sky gazers Andreas (asoehn), Jörg (senner05), Christian (astrochris), Rainer (drknoppi) and many others who gave their ideas and private effort to make this project possible and as big as it is today.

Thank you!!!